Toxicologists react to food law

page 28

Ion-exchange catalysis grows

page 32

More than 250 terse reports on chemicals, instruments, new processing techniques, equipment 6

MARCH 1960

CHEMICAL PROCESSING

with PROCESS DYNAMICS

National STARCH and CHEMICAL Triples Sales in Decade By User/Research Teamwork

PAGE 26

Behind surge to $52 million sales are (l to r) Pascal, Greenwall, Dillon

A PUTMAN PUBLICATION | "Executive Magazines for Industry" $1.00 the copy

SULFONATE DERIVATIVES
Potassium Acetaldehyde Disulfonate
Methane Trisulfonic Acid
Sulfamide
Sulfuryl Fluoride
Sulfur Trioxide-Pyridine Complex
Sulfur Trioxide-Trimethylamine Complex

CHLORINATED COMPOUNDS
Hexachloroacetone
Trichloroacetamide
Trichloroacetdimethylamide
Trichloroacetanilide
Trichloroacetonitrile

OXALIC ACID DERIVATIVES
Oxanilide
Ethyl Oxanilate
Oxalic Esters

PHOSGENE DERIVATIVES
Benzophenone
Benzophenone-4,4'-dicarboxylic acid
Diphenyl Carbonate
Ditolylketone
Di-o-Tolyl Carbonate
Di-m-Tolyl Carbonate
Di-p-Tolyl Carbonate

In addition, derivatives other than those listed in each category can be investigated and possibly made available.

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"FISHING EXPEDITION"...

Yes, we're fishing! We've developed the new organic fine chemicals which are listed at right. We don't know much about their uses as yet. But we do have limited technical data for each of these compounds, and will be glad to send this to you on request. Also, if you're interested enough to do a little "fishing" of your own, we can let you have sample quantities in most cases.

Commercial production? Not yet. But if enough demand materializes, we can supply these new organics in commercial quantities.

Development of these new organic compounds is another example of the diversified activities of our Baker & Adamson® fine chemicals department. May we suggest—*whenever it comes to fine chemicals, come to Baker & Adamson!*

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Fine Chemicals

Allied Chemical

GENERAL CHEMICAL DIVISION
40 Rector Street, New York 6, N.Y.

Check 3778 opposite last page.

conventions and exhibits

February 29-*March* 4. The Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy, Exposition of Modern Laboratory Equipment, Penn-Sheraton Hotel, Pittsburgh, Pennsylvania.

March 10-11. The Fiber Society, Spring Meeting, Roosevelt Hotel, New Orleans, La.

March 15. Synthetic Organic Chemical Manufacturers Association, Meeting, Palm Terrace Suite, Hotel Roosevelt, New York City.

March 14-18. National Association of Corrosion Engineers, National Meeting, Dallas, Texas.

March 17. Commercial Chemical Development Association, Hotel Plaza, New York City.

March 20-24. (1961) The American Society for Metals, 13th Western Metal Exposition and Congress, Trade and Convention Center, Philadelphia, Pa.

April 3-6. American Oil Chemists' Society, Spring Meeting, Baker Hotel, Dallas, Texas.

April 3-8. 1960 Nuclear Congress, The Coliseum, New York City.

April 4-7. 29th National Packaging Exposition, American Management Association, Convention Hall, Atlantic City, N. J.

April 5-7. Instrument Society of America, National Chemical and Petroleum Symposium, Rochester, N. Y.

April 5-14. National American Chemical Society Extended Meeting, Sheraton - Cleveland Hotel, Cleveland, Ohio.

April 8-9. Society of Plastics Industry, Inc., 17th Western Section Conference, New Riviera Hotel, Palm Springs, Calif.

April 18-19. Third Annual Conference on Automatic Techniques, Cleveland-Sheraton Hotel, Cleveland, Ohio.

... Meetings and shows of interest to the chemical industries

April 27-29. Instrument Society of America, Sixth Annual Southeastern Conference and Exhibit, and First Pulp and Paper Division Symposium, Pensacola, Fla.

May 1-5. The Electrochemical Society, Inc., Meeting, LaSalle Hotel, Chicago, Ill.

May 9-12. Second Instrument Society of America, Instrument Automation Conference and Exhibit, Civic Auditorium, Brooks Hall, San Francisco, Calif.

May 9-13. American Society for Metals, Second Southwestern Metal Exposition and Congress, State Fair Park, Dallas, Texas.

May 23-26. The Design Engineering Show and Annual Design Engineering Conference, Coliseum, New York.

June 5-9. The Society of the Plastics Industry, Inc., Ninth National Plastics Exposition, Coliseum, New York City and the SPI National Conference, Commodore Hotel, New York City.

June 13-15. The Chemical Institute of Canada, 43rd Annual Conference and Exhibition, Chateau Laurier Hotel, Ottawa, Ont., Canada.

August 8-9. Third Annual Rocky Mountain Spectroscopy Conference, Rocky Mountain Spectroscopy Section of the Society for Applied Spectroscopy, Denver, Colo.

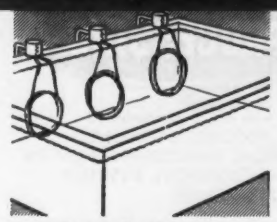
August 10-12. 9th Annual Denver Research Institute Metallurgy Division's X-ray Conference, Denver, Colo.

August 14-17. American Institute of Chemical Engineers Fourth National Heat Transfer Conference, Statler Hotel, Buffalo, N.Y.

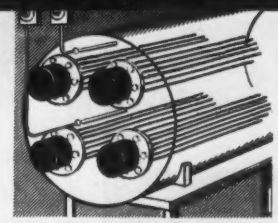
August 23-25. Cryogenic Engineering Conference, University of Colorado, Boulder, Colo.

September 26-30. Instrument Society of America, Instrument-Automation Conference and Exhibit, Coliseum, New York City.

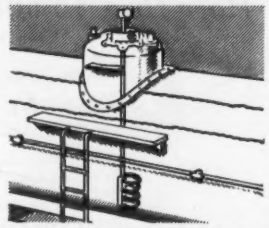
Call your CHROMALOX Man for heating answers



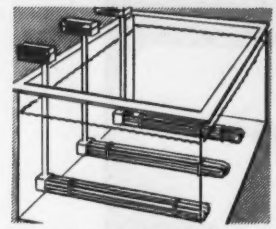
For plating applications, Chromalox CT Immersion Heaters are sheathed in lead, copper, stainless steel.



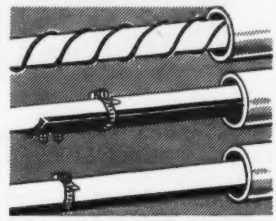
Water heating with TM flange-type Immersion Heaters mounted at one end of a tank.



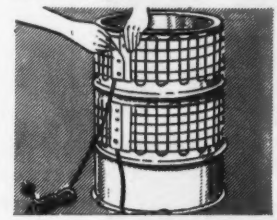
Heating viscous materials with BLCK Immersion Heaters before pumping from a railroad tank car.



Heating liquid held at constant level. TL Heaters generate heat parallel to the tank bottom.



Pipe heating with Chromalox Thermwire (300°F), Strip Heater (750°F) and Tubular Heater (1100°F).



Heat for 5- and 55-gallon drums. Just snap on and plug in. Protective coating resists abrasion, chemicals.

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- He orders from the world's largest stock.
- And he is a *heating expert* . . . he understands your problem and can help you find the answer.

No matter what your heating problem is . . . solids, liquids or gases . . . call your Chromalox Man for the efficient, *electrical* answer. (*His phone number is listed at the right.*) Or, check the boxes below, write your name, title, and address at the bottom of this page and mail the coupon to us. Edwin L. Wiegand Company, 7500 Thomas Boulevard, Pittsburgh 8, Pa.

☐ Send me Catalog 60 (General Industrial heating applications).

☐ Have a Chromalox Representative contact me.

☐ Send me specific information on the heating problems I have outlined on the sheet attached.

☐ Do not have a Chromalox Representative contact me.

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CHROMALOX Electric Heat

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Teflon* Gaskets and "O" Rings Definitely Reduce Costs

... last for the life of the connection even in services such as concentrated acids, alkalis or solvents (except molten alkali metals).

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Reduce *your* corrosive sealing costs with John Crane Teflon Gaskets, "O" Rings and Back-Up Rings. They are available in a full range of types and sizes, envelope or solid, also specials to specification. Request Catalog P-327 for complete facts.

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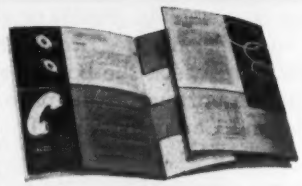

John Crane — MECHANICAL PACKINGS — SHAFT SEALS — TEFLON PRODUCTS — LAPPING MACHINES — THREAD COMPOUNDS

CRANE PACKING COMPANY

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CHEMICAL PROCESSING

with which is combined
PROCESS DYNAMICS
CHEMICAL PROCESSING PREVIEW
and CHEMICAL BUSINESS

March 1960

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Volume 23 • Number 3

For the management team
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Published Monthly by
PUTMAN PUBLISHING COMPANY
111 East Delaware Place
Chicago 11, Illinois
Telephone: WHitehall 4-6141

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Accepted as Controlled Circulation publication at Mendota, Illinois. Publication office: 1501 W. Washington Road, Mendota, Illinois. Address all correspondence to Editorial and Executive office, 111 East Delaware Place, Chicago 11, Illinois

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over the editor's shoulder

Computer invades library to speed up research

A December-June marriage between library science and computer technology is showing promise of spawning many benefits for industry in the form of research speed-up and reduced costs.

At Western Reserve University's Center for Documentation and Communication Research, a computer-like electronic scanning device, called a searching selector, is reviewing stored information — abstracts of metallurgical reports — and retrieving relevant references for researchists.

A new selector under construction will be capable of reviewing the world's scientific literature in 112½ hours.

Potential impact of all this is indicated by comment of one industrial executive who estimates that any improvement in library methods which would cut a research worker's time by 1% could save industry $20 million a year.

Basic missionary work toward realizing the not-so-ephemeral dream of a World Document Center has already been started at WRU. Cost estimates for such a center where scientific information would be abstracted and encoded start at $36 million.

This work could presage the day when subscribing companies would be linked by teletype and photofacsimile networks to such a center. Requests for data, properly programmed by the company "librarian," could be teletyped directly into the selector, relevant references retrieved and referred to another machine which would sort out pertinent abstracts stored on microfilm or teletypesetter tape. These could be photocopied and transmitted by facsimile, in the case of microfilm, or by teletype if tape were used.

Buck Rogeresque? Perhaps, but then so were rockets to the moon five years ago.

Assistant Editor

Want to be an Executive?

Management is actively looking for engineers who have the desire and ability to become administrators

by
James M. Jenks

In a sense, this is the golden age for engineers. Once buried in corporate obscurity, many of them have emerged today as likely heirs apparent to the big jobs — and the big rewards — of business and industry. One impressive indication of this growth is that money spent in research and development over the past fifteen years has increased six-fold.

Despite this stepped-up activity, however, the once disorganized scramble for engineers seems to have ended . . . at least temporarily. And perhaps it's a good thing. Actually, the more perceptive engineers had always realized that unusually high starting salaries were often illusory. The gap between money being offered beginners and the incomes of experienced men was narrowing rapidly. Further, more and more thinking technical men concluded that even top engineering salaries are low when compared with the remuneration of highly placed general executives.

A Plan to Help the Engineer Succeed

Happily, there is a route to increased incomes that is satisfying to both engineer and company alike. This route leads into *management*. It is no easy road but the rewards are great for those willing and able to follow it.

In the vast, complicated world of business the engineer has much to learn. As a manager his duties will bring him into contact with accountants and buyers, advertising men and salesmen, lawyers and other executives. A strange new set of circumstances confronts him. He must gain confidences and be understanding, learn and instruct, be sympathetic, paternal or commanding as conditions require . . . and all in the midst of a business organization about which his knowledge is limited.

Actually, it comes down to this: To succeed as a business executive, the engineer must learn the art of making decisions quickly and accurately. And this ability is, of course, directly dependent upon knowledge. The "principles" of business—while not as scientific and inexorable as those of engineering—are no less important . . . no less essential to efficient procedure.

For nearly fifty years, the Alexander Hamilton Institute has specialized in bringing this knowledge to mature men—at home in their spare time.

Free . . . "Forging Ahead in Business"

We do not claim that you must have the Alexander Hamilton Course in order to succeed in business. But we do say that *you cannot succeed without what is in the Course!*

All the Institute does is offer you a convenient and time-saving means of bringing this knowledge to you in your spare time; and in a form that has *proved* to be practical and effective.

So that you may judge for yourself whether or not you think the Institute can help you, we have published an informative 48-page book titled "Forging Ahead in Business."

We believe that this little book will help any man get down to bedrock in his thinking; however, there's no cost or obligation for it because—frankly—we've never been able to put a price on it that would reflect its true value. Some men have found a fortune in its pages.

If you would like a complimentary copy of "Forging Ahead in Business", simply sign and return the coupon below. It will be mailed to you promptly.

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CHEMICAL PROCESSING

HIGHLIGHTS

MARCH 1960

VOLUME 23 • NUMBER 3

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THIS MONTH'S COVER

By putting into practice an idea that sales could be stimulated by having a research team help customers find out what they really need, the three men on our cover have guided National Starch and Chemical Corporation to the point where sales ($52 million plus) have been tripled in 10 years. Left to right are Don Pascal, president; Frank Greenwall, chairman of the board; and James Dillon, senior vice president. For story behind this growth, turn to page 26.

Spotlight On People

Allied Chemical Corporation has announced a number of promotions and changes. WILBUR H. BRUMFIELD has been appointed president of Solvay Process Division; FRANK J. FRENCH, president of General Chemical Division; and FRANK M. NORTON, executive vice president of Plastics and Coal Chemicals Division. Assistant to the president of Nitrogen Division is NORMAN E. HATHAWAY. JOHN B. GREEN becomes assistant to the president of Solvay Process Division; ROBERT H. REED is director of development and C. RUSSELL HALL is appointed division comptroller.

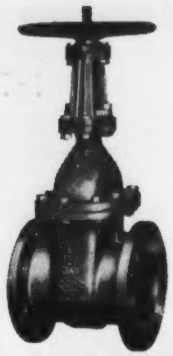
Appointed vice president—marketing for National Carbon Company, division of Union Carbide Corporation is CHARLES J. CHAPMAN. Union Carbide Chemicals Company, another division of the corporation, has appointed LEWIS E. MISSBACH, assistant to director of engineering.

RICHARD J. HEFLER, vice president, has been elected to board of directors of American Potash & Chemical Corporation. Election fills the vacancy created by the death of WILLIAM J. HUTCHINSON. DR. HOWARD E. KREMERS has been appointed district manager of Market Development.

Witco Chemical Company, Inc. has made three changes in management of Organic Chemicals Division. HAROLD B. SELIGMAN is now vice president and general manager; JEROME HARRISON, vice president and director of marketing; and STANLEY D. SHAW, midwestern sales manager.

President of the company and chairman of the executive committee of the board of directors of Rohm & Haas Company is now DR. F. O. HAAS. DR. RALPH CONNOR has been elected chairman of the board and JOHN C. HAAS, vice chairman of the board.

LAWRENCE A. ROE has been appointed staff director, Minerals Processing, Research, Engineering and Development Division of International Minerals and Chemical Corporation. RAYMOND E. TUTTLE, suc-



In this Split Wedge Gate

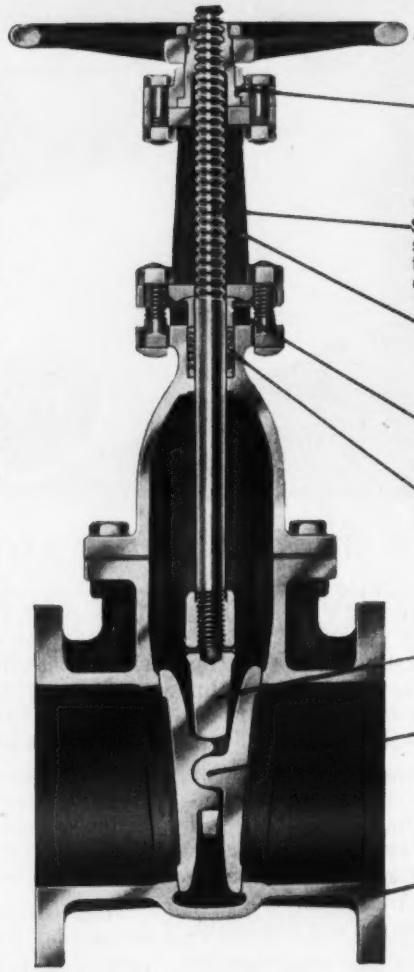
you can see why it pays to

Specify JENKINS for STAINLESS STEEL Valves, too

This picture shows the many points of excellence in the design and construction of Jenkins Fig. 1327 Split Wedge Stainless Steel Gate Valves. Compare them with any valve you know. You'll conclude that it's hard to beat Jenkins at making valves, no matter what the material.

But no picture can show the quality of the castings . . . the precision machining . . . the rigid inspection and testing that have gone into this valve. All of these are as important as design and metal alloys in assuring long, dependable, economical valve service. And, all of them are up to the peak standards for which Jenkins has been known for almost a century.

SEND FOR NEW CATALOG of Jenkins Stainless Steel Valves. You'll find in it the patterns you want, in a choice of alloys that satisfy the requirements of practically all corrosive services. Also, you'll see that these Jenkins valves meet valve industry specifications and the high standards established by the leading users of stainless steel valves. Jenkins Bros., 100 Park Avenue, New York 17.



WHEEL of high strength malleable iron designed for firm grip and easy operation.

YOKE BUSHING, easily renewable. Made of bronze, for ideal thread engagement with stainless steel spindle, to prevent seizing or galling of spindle threads. Bushing of stainless steel is optional.

SPINDLE has long thread bearing surfaces with correct lead for easy, tight closing. Screws into wedge carrier, then secured by a stainless steel pin.

YOKE BONNET has liberal space between yoke arms for easy access to packing box. Precision machined flange face assures uniform contact with gasket for a tight body-bonnet joint.

GLAND consists of two pieces — gland flange and gland follower — eliminates binding of follower in case gland bolts are tightened unevenly.

PACKING of Chevron-type Teflon in large packing box prevents leakage. Only a minimum load is required on gland, extending service life of packing.

WEDGE CARRIER connects wedge to spindle and raises or lowers it. Husky in size to stand any operating strains.

SPLIT WEDGE is the ball-and-socket design which automatically adjusts to the tapered seating surfaces for positive shutoff. The discs, revolving freely in the wedge carrier, produce a self-cleaning action on seating surfaces and reduce possibility of galling and seizing.

BODY —Through-port design for full, free flow. Ample wall thickness and good design provide extra strength to withstand stresses. End flanges conform to M.S.S. specs.

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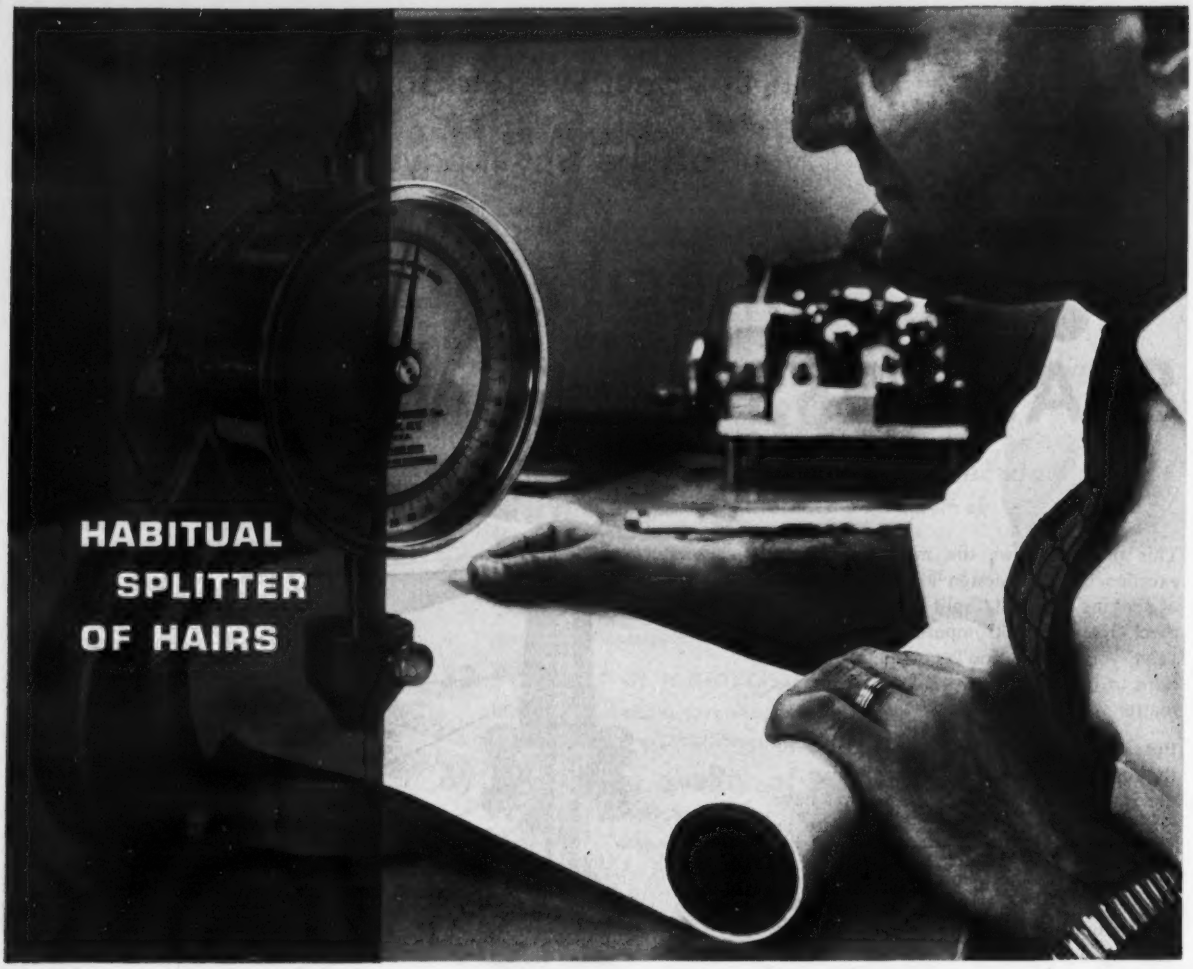


. . . because a mil can matter greatly in
RECORDING CHART PERFORMANCE

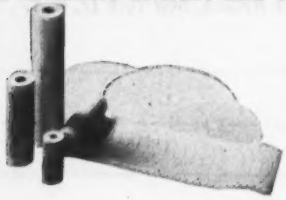
Even a fraction of a mil can bulk large in the thickness of a recording chart. That's why John Mazurowski and his thickness micrometer are so important to chart users.

A process change in an eastern oil refinery, for example, called for a longer strip chart in a temperature recorder — but the diameter of the roll could be no bigger than before. GC engineers solved this problem by working with our paper mills to reduce chart paper thickness from 0.00275" to 0.0019" while preserving strength and flexibility.

To make sure our charts meet the requirements of your instruments, GC engineers test paper stock for moisture content and tear-strength, too. This rigid inspection of paper that is produced exactly to GC specifications is a major reason why GC Recording Charts consistently fulfill their promise of accurate performance.

Other reasons for GC quality include our special formula printing inks, our exclusive innovations in plate-making and printing, and the scrupulous humidity control maintained throughout our manufacturing and storage areas.

GC Recording Charts have become standard equipment in more than 5,000 plants today. We stock more than 15,000 different charts—and will design and produce accurate special-purpose charts. Send for our 1960 Stock List — and for sample charts.



RECORDING CHARTS

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PEOPLE

ceeds Mr. Roe as director of development.

Borden Chemical Company's president, AUGUSTINE R. MARUSI, has been elected a director of the Borden Company. HOWARD C. SHEPERD has also been elected a director.

Election of JOHN D. ZIGLER, and JOSEPH M. MCGARRY as vice presidents of International Minerals & Chemical Corporation has been announced.

Appointment of L. DEAN TYLER as sales manager for Merlon polycarbonate resins has been announced by Mobay Chemical Company.

All research on petroleum products and processes of Standard Oil Company (Indiana), American Oil Company and Utah Oil Refining Company has been consolidated into a single research and development department with DR. PHILIP C. WHITE as general manager. Headquarters is in Standard's general offices at Chicago.

Hercules Powder Company has elected DR. ROBERT W. CAIRNS to the board of directors. RAY N. WHEELOCK has been named director of company's enigneering department following retirement of ERNEST S. WILSON. Other appointments include newly-created post manager of market development for synthetics department, HERBERT F. SCHAEFER; and DR. ERNEST TURK, director of development, for same department. Four executive appointments in the new international department have been announced. WILLIAM L. CAHALL, director of sales; WARREN F. BEASLEY, director of development and operations, Western Hemisphere; HARVEY J. TAUFEN, director of development and operations, Far East; HENRY REEVES, JR., director of development and operations, Europe.

A newly-created position of director of marketing for United States Borax & Chemical Corporation is being filled by WILLIAM J. DIBBLE. Other appointments include R. W. HINCHMAN as director of industrial chemical sales; J. E.

FLETCHER, director of plant food sales; L. R. BOYNTON, director of field sales operations, and J. M. NUNN, director of advertising and sales promotion.

Reichhold Chemicals, Inc., has named DONALD G. PATTERSON as vice president — plastics. He will retain responsibility for all RCI activities in plastics area, including resins for adhesives, laminating, casting and molding, with the exception of phenolics.

T. W. BRASFIELD has been made director of marketing for Velsicol Corporation. He will be responsible for all of Velsicol's marketing activities in the United States.

Board of vice presidents of Thiokol Chemical Corporation has two new members, DR. HAROLD W. RITCHEY and JOSEPH C. JORCZAK.

The newly-created post of vice president for research and development is being filled by DR. RUSH F. MCLEARY of Jefferson Chemical Company, Inc.

ROBERT R. SMITH has been appointed director of sales of Du Pont's film department. He succeeds J. EDWARD DEAN who will become director of the company's advertising department.

Appointment of DAVID X. KLEIN to position of divisional vice president has been announced by Heyden chemical division, Heyden Newport Chemical Corporation. American Plastics Corporation, a subsidiary of Heyden Newport, has elected JOHN A. PARSONS as president, and ELMER G. SMITH as executive vice president.

Overseas division of Archer-Daniels-Midland Company has a new vice president, ROGER E. VARIN.

Niagara Chemical Division of Food Machinery and Chemical Corporation has announced the formation of a marketing research department and appointed J. LLOYD POLAND as manager. RALPH FREUND was named a market analyst for new department.

National field sales manager of chemical division of General Mills is now ALFRED G. DEMEURISSE.

Spencer Kellogg and Sons, Inc., have elevated HOWARD

CHEMICAL PROCESSING serves members of the Management Team in these industries:

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Gum & wood chemicals (Naval stores)
Fertilizers
Animal & vegetable oils & fats
Miscellaneous chemicals (cosmetics & toiletries, inks, insecticides, water treatment chemicals, etc.)
Paper & allied products
Petroleum, coal, coke-oven products
Rubber products
Stone, clay & glass products
Atomic energy establishments

Other Industries Utilizing Chemicals or Chemical Processes

Food and allied products
Textile dyeing & finishing
Leather tanning & finishing
Metal & alloys
Machinery & equipment
Allied products (tobacco, photographic film, instruments, fabricated plastic products, etc.)
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Government (including ordnance, missiles, etc.)

Specialized Services to the Chemical Processing Field

Plant construction consulting firms
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Manufacturers of specialized chemical equipment

Subscriptions

QUALIFIED-READER SUBSCRIPTIONS are accepted from selected management and technical key men in the chemical industries without charge. To apply for a qualified-reader subscription fill in and mail the request-qualification form opposite last page.

OTHER SUBSCRIPTIONS — from "non-qualified" persons (those who are not key processing men in the chemical industries) — are accepted at $1.00 the copy, or $10.00 the year. Foreign subscriptions — subscriptions from countries outside the territory of the United States and its possessions are acceptable at $35.00 per year. Such subscriptions are not counted as "industry circulation" on BPA audit reports.

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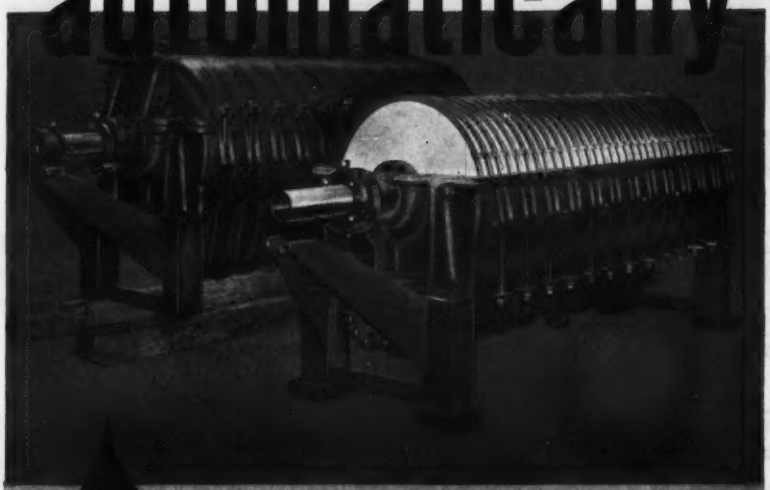
CORN SYRUP
automatically



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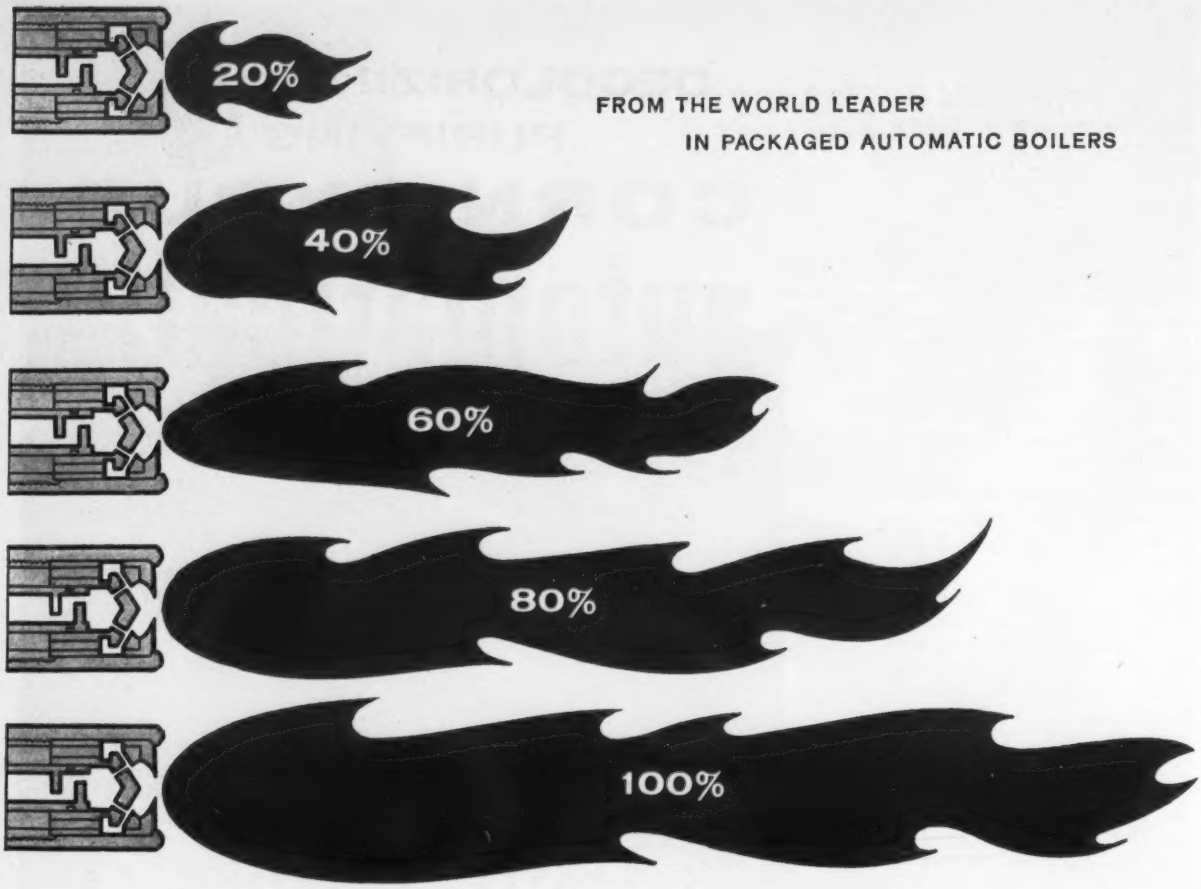

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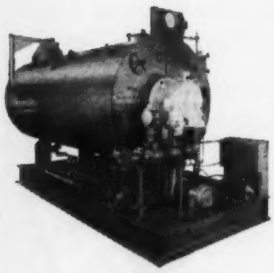

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PEOPLE

KELLOGG, JR., to position of chairman of the board. Succeeding Mr. Kellogg as president is FRED W. THOMAS.

DR. DAVID P. LANGLOIS has been made director of administrative services for market development at A. E. Staley Manufacturing Company. Director of chemical market development title goes to DR. M. J. THOMAS.

Nopco Chemical Company has announced election of DR. MELVIN HOCHBERG as a director of the company. GEORGE G. STIER has been elected president, and HARRY A. BATLEY, executive vice president.

Century Chemical Corporation has made a number of executive changes. WILLIAM O. BLESSE was named vice president of manufacturing. WERNER SAMTER was appointed vice president of production and research for its recently acquired subsidiary, Chemo Puro Manufacturing Corp. and JOHN L. WALMSLEY, manager of Century's asphalt division.

CHARLES W. CARVIN, JR., has been named director of merchandising for Chemstrand Corporation.

Grace Chemical Division of W. R. Grace & Company, has announced appointment of ALFRED F. DUGAN as director of planning. He will be responsible for planning, development and co-ordination of divisional projects in addition to management administrative functions.

Lucidol division, Wallace and Tiernan Incorporated, has appointed DR. J. B. HARRISON director of research and development. R. M. BERRY was appointed manager of this department. Other promotions announced were W. R. PELLOM to newly-created post of assistant sales manager; D. C. NOLLER, supervisor, technical service laboratory, and S. W. BUKATA, supervisor, analytical & control laboratory. Recent additions to the expanding Lucidol organization were DR. DAVID B. GUTHRIE, assistant chief chemist, research and development, and E. J. WANDEL, chemist, process development laboratory.

Watching Washington

Alarmed by Chemical-use Restraints, Farm Groups Ask Scientific Study

As chemical processors scramble to meet March 5 deadline for clearances under the food additives law, farm groups — concerned over Department of Health, Education and Welfare judgments under the law — are urging Congress to establish a commission of scientists to study the use of chemicals in foods. They hope that such a commission would produce a more realistic and scientific administration of the food additives law.

On the other hand, alarms over cranberries, chicken, carbon black, milk, color and whatever's next, add up to mounting public mistrust of chemicals in foods. This results in demands also being made on Congress for even stricter legislation.

Sounds Warning

One positive note comes from Secretary of Agriculture Ezra Taft Benson.

"We cannot continue to produce adequate amounts of safe and wholesome foods without chemicals," the Secretary said in a recent policy statement on chemicals and foods, believed to be an effort to ward off toughened legislation on farm and food chemicals. USDA is concerned that use of several chemicals is threatened by too strict enforcement of the law.

"Abandoning the use of chemicals on farms and in the food industry," Mr. Benson said, "would result in immediate decline in the quantity and overall quality of our food supply and cause a rapid rise in food prices paid by consumers."

"Farmers, processors, and distributors all have a stake in the proper use of agricultural and food chemicals," he declared. "Their concern with the safety and wholesomeness of the food supply is identical with that of consumers."

Mr. Benson concluded his statement with a plea to farmers and processors to follow instructions on the label for the safest, most profitable way of using chemicals. Experiments show, he said, that there is no advantage to overuse of chemicals. The manufacturer is required to prove that when used as prescribed, a chemical will do the job claimed for it and will not leave a harmful residue.

USDA is intensifying its educational campaign on the proper use of agricultural chemicals. A series of leaflets, due soon, and similar materials from the states will be widely distributed to growers and handlers of foodstuffs.

Pesticide Restricted

A few days after the USDA statement, the Food and Drug Administration enacted severe restrictions on the use of heptachlor, a pesticide widely used to fight fire ants. Farm groups protested that possible danger from residues of the pesticide was slight.

FDA's action is based on a longstanding policy prohibiting pesticide residues on crops unless it has been established how much residue will result from use of the pesticide, and that this amount will be safe for the consumer.

According to FDA, new scientific data shows that in addition to residues of hep-

for GRINDING AND DEHYDRATION
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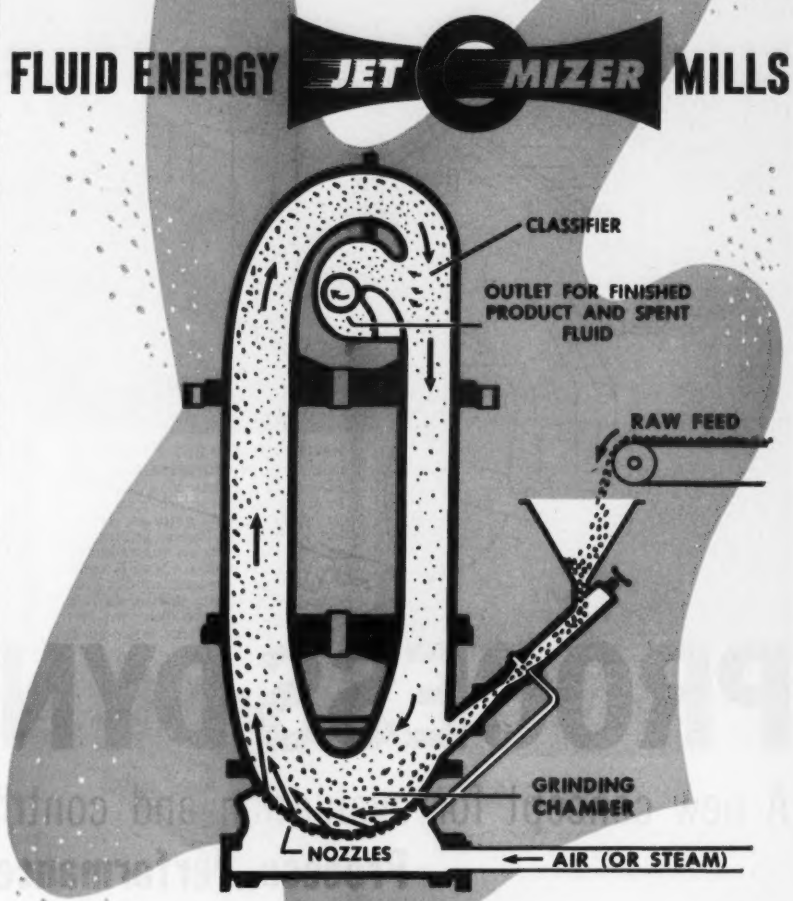

The Fluid Energy "Jet-O-Mizer" Mill, designed and built by the pioneers in fluid energy fine grinding, does far more than produce fine particles. It controls fineness and product quality with a narrow distribution range and simultaneously with grinding can dehydrate, coat particles, blend and achieve chemical changes.

Jet-O-Mizer Mills are being used all over the world, processing many types of materials in the following industries:

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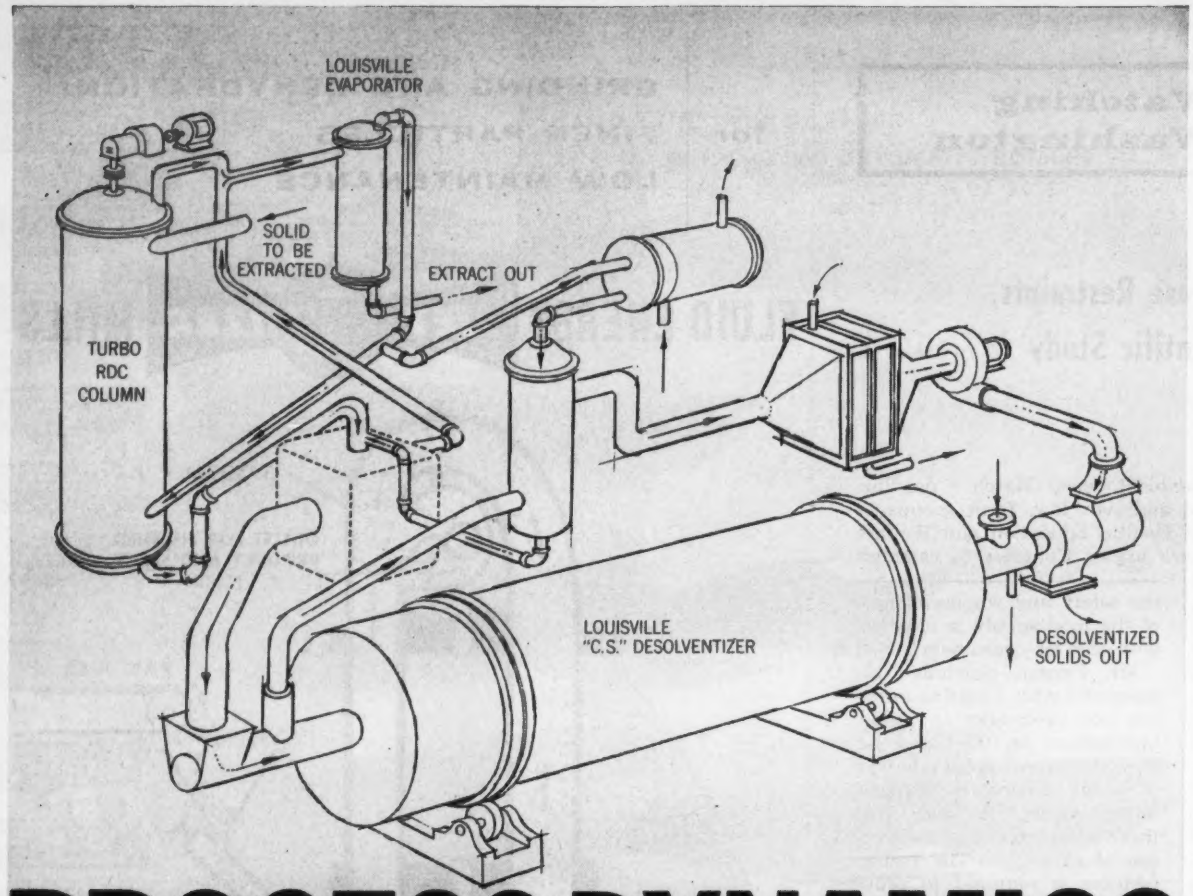

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Check 3787 opposite last page.

tachlor, a breakdown product of heptachlor — called heptachlor oxide — is present on treated crops. Epoxide residues appear in meat and milk when forage containing it is fed to experimental meat and dairy animals. No residues of heptachlor have been found in meat or milk.

However, data are not available to show how much of the epoxide may be present under varying conditions, nor has toxicity of the epoxide been fully evaluated in tests conducted so far.

Farmers are so up in arms over several recent FDA actions that they plan to ask the President to transfer FDA activities to the Department of Agriculture.

Such a transfer is highly unlikely in that FDA was originally removed from USDA control in 1940 on the grounds that an agency primarily concerned with protection of the public in food and drug areas belonged in a department concerned with the nation's health rather than the interests of the farmer.

Modernized depreciation law urged by senators

Further impetus for modernized depreciation legislation (September CP, page 30) comes from the Senate Small Business Committee.

A committee report cites inflation and technological obsolescence of production equipment as "twin factors that make depression-born depreciation policies inadequate today."

The report urges Congress to consider all practical proposals for shortening the period for depreciating property, permitting greater depreciation in the years immediately after purchase and depreciating property on bases other than cost to reflect the inflation factor.

Finally the report calls for extension of depreciation methods to include purchasers of used equipment and provisions allowing tax deductions for earnings plowed back into small businesses.

Study finds industrial uses for farm output

In the progress report on last year's government research to find wider industrial uses for farm products, USDA points to such promising developments as these:

Phosphomannan, a product produced by fermentation of starch, for use as an adhesive and thickening agent. According to the report, some 30 companies are evaluating this material and 4 have already expressed interest in producing it commercially.

Plastic foams made from castor oil. About 1 million pounds of castor oil was used in these products in 1958, and expanded markets are predicted.

Water-soluble zein, a chemically modified protein of corn, potentially useful in lacquers and printing inks.

Use of animal fats in plastics and livestock feeds.

Congress is now considering legislation to get more funds for continuing and expanding agricultural utilization research.

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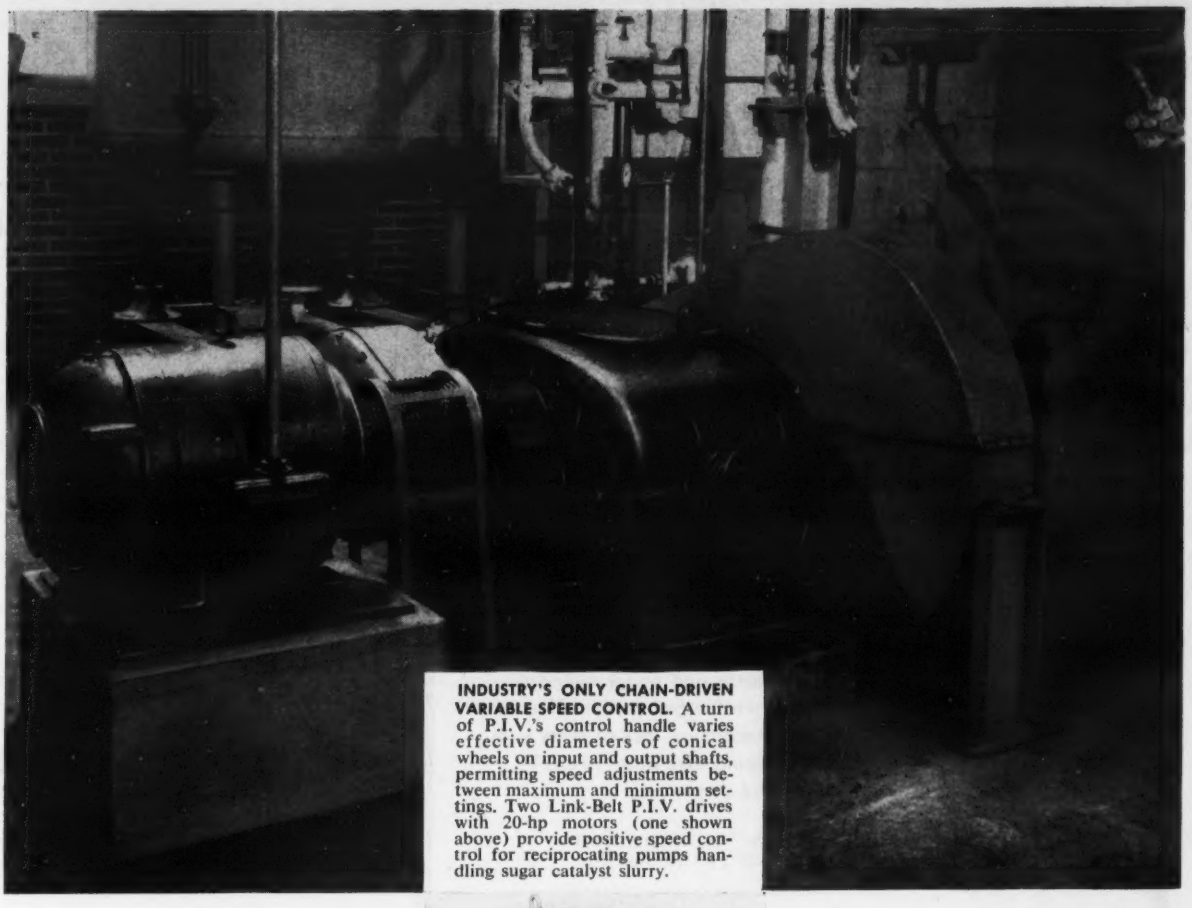
Don't forget to include your name, address, and company affiliation.



INDUSTRY'S ONLY CHAIN-DRIVEN VARIABLE SPEED CONTROL. A turn of P.I.V.'s control handle varies effective diameters of conical wheels on input and output shafts, permitting speed adjustments between maximum and minimum settings. Two Link-Belt P.I.V. drives with 20-hp motors (one shown above) provide positive speed control for reciprocating pumps handling sugar catalyst slurry.

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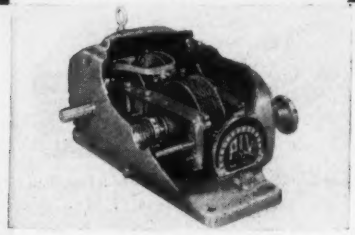

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Where operations requiring variable speed control can't tolerate slip—no other mechanical drive is equipped for the job like Link-Belt P.I.V. With its all-metal, self-tooth-forming chain that maintains positive grip with radially grooved wheels, it offers a degree of accuracy . . . a level of efficiency—unique in the field. Speeds can be varied in an instant, regardless of load, without interrupting the driven machine. And P.I.V.'s all-metal construction ignores atmospheric conditions.

The complete story is contained in Book 2274. Your nearest Link-Belt office or authorized stock-carrying distributor will supply a copy.

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LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There are Link-Belt Plants, Warehouses, District Sales Offices, and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World 15,056

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CPI Proves Fertile Ground for Diversification Expansion

WILLIAM R. WHITE, Market Analyst
Hornblower & Weeks

Growth characteristics of the chemical industry continue to attract corporate managements seeking diversification in areas outside their own specialized fields. The advantage of low manufacturing costs inherent in petrochemical operations holds special appeal in these days of steadily mounting wage demands. It is interesting to note the wide diversity of industries finding reasons for identification with some phase of chemical activity.

Although Celanese Corporation of America had its inception in chemical research, the company is considered a leading representative of the textile industry; its shares have fluctuated erratically in reflecting ups and downs of the textile business.

In developing new raw materials, it was only natural, therefore, for management to stress possibilities in plastics. Volume in plastics has grown faster than any textile products. Celanese and Imperial Chemical are partners in a program designed to produce a polyester type of fiber known as Teron. Celanese probably is the largest source for acetic acid.

With sales of the chemical division alone climbing at an average rate of 15% annually for a decade, volume reached a record peak in 1959. Improvement in margins resulting from price increases attained in the last year is expected to continue and holds promise of further recovery in earnings to the best level since 1950. Dividends were supplemented last year with a 25% distribution in stock after the cash rate had been liberalized.

Because Koppers is recognized as a leading factor in building coke ovens, open-hearth and blast furnaces and chemical plants, it usually is classified as a representative of heavy industry. Increasing emphasis has been placed on expansion in chemicals—especially plastics and dyestuffs.

Products include ethylbenzene, styrene monomer, polystyrene, sulfuric acid and sodium cyanamide. By end usage, sales have climbed to around 40% in chemicals, plastics, rubber and dyes.

A further contraction in sales and earnings recorded last year, continuing a setback begun in the 1958 recession, was caused chiefly by severity of the steel strike and its effect on allied industries.

Potential business has expanded, however, as a consequence of postponement of expansion programs. For this reason a rebound in sales and earnings is expected to gain momentum this year. Sales could approach the 1957 peak of $326 million, while earnings should range well above figures of the last two years. Such a showing may encourage hope of an increase in the $1.60 dividend rate.

Intrigued by potentials in chemicals derived from the kraft pulping process, Crown Zellerbach has embarked upon commercial production in Louisiana of dimethyl sulfide and dimethyl sulfoxide. This move is expected to add between $2 and $4 million in annual sales.

Management feels confident that, because of low costs, the chemicals can be offered at 20% or less of prevailing prices.

(For further information on chemical stocks write Hornblower & Weeks, 40 Wall St., New York 5, N.Y.)

Check 3790 opposite last page.

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U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

Latest Statistics On Chemical Industry Given in New Facts Book

The 1960-61 edition of the Chemical Industry Facts Book, published recently by the Manufacturing Chemists' Association, presents a great deal of valuable data on the history, growth, contributions and current position of the industry. The book indicates that by mid-1959, in terms of assets, the chemical industry was fourth in size among all U. S. industries.

Eleven of 20 chapters in the new volume cover history, distinctive characteristics, products, position in the economy, contributions to the economy, future prospects, raw materials, workers, plants, finances, research and development. Nine more chapters discuss chemistry's contributions to food, agriculture, clothing, shelter, health, transportation and communications, defense, nuclear energy and space exploration.

New Fabrication Techniques Make Commercial Titanium-Clad Vessels a Reality

New bonding and welding methods have made it possible to construct a 4-foot diameter, 12-foot high, titanium-clad steel pressure vessel for processing highly corrosive chemicals at elevated pressures and temperatures. The vessel has been proved out through almost a year of service. As a result, titanium cladding is indicated as a cost-cutting measure in the manufacture of corrosion-resistant equipment for the Chemical Process Industries.

To avoid the problems of titanium contamination and brittle welds inherent in the direct joining of titanium and steel, an unidentified metallic powder is placed between the titanium-cladding sheet and the steel backing plate. By applying heat to liquefy the powder, and vacuum to insure a good seal, the cladding is bonded to the backing plate without direct contact between the two metals.

The clad plates are then welded to each other by another special process. Here, steel is joined to steel with a conventional weld. Then a silver inlay is laid along the joint on the titanium side, and covered with a fillet-welded titanium strap. This process eliminates contact between steel and titanium at the joint, and gives the vessel an all-titanium inner surface.

Butyl Acetate Data Sheet Now Available from U.S.I.

Specifications, properties, shipping data and applications for normal butyl acetate are given in a new data sheet just released by U.S.I. This material is the most widely used medium-boiling nitrocellulose solvent. It also finds application in the manufacture of cements, coated papers, lacquers, leather finishes, linoleum, textile sizing, thinners and a host of other products.

The data sheet can be obtained from U.S.I. sales offices or from the New York office at 99 Park Avenue.

New U.S.I. Technique Improves Optical Properties of Blown Polyethylene Tubing

Annealing Chamber Increases Light Transmittance, Reduces Haze

The U.S.I. Polymer Service Laboratory has developed an annealing chamber or "chimney" technique which results in significant improvement in clarity and gloss of blown polyethylene tubing, with practically no sacrifice of physical strength. The method involves installation of a chamber which encloses the blown tubing between extruder die and air ring.

Unit is easy to install

The chimney may be made of wood, glass or insulated metal. It should be constructed in two sections or hinged to permit installation during extrusion . . . thus eliminating need for rupturing the "bubble" when threading film through the annealing chamber.

Height of chimney is a critical factor. Optimum results are usually obtained with a 6 to 12" chimney height. While ratio of chimney diameter to die diameter is not critical, it should be held between 2:1 and 3:1. For example: a 3" die would require a 6 to 9" diameter chimney.

An evaluation of PETROTHENE P-200-25 resin using this technique revealed:

Optical Property	*No Chimney*	*8" Chimney*
Transmittance	30%	70%
Gloss	7%	11%
Haze	11%	4%

No significant change was noted in impact strength. Elmendorf tear tests showed that a directional strength balance was brought about by adding the chimney. Tear values increased in the transverse direction and decreased in the machine direction. Yield, break and elongation were essentially unchanged.

MORE

First Nonconjugated Polyacetylenes Synthesized By New, Low-Cost Process

Good yields of large carbocyclic compounds containing nonconjugated triple bonds have been achieved via a new process claimed to be simple and economical. The resulting compounds are being investigated by the rocket field as high energy binders and plasticizers for solid propellants and as intermediates for solid boron fuels. Other applications as intermediates are indicated by the presence of regularly spaced triple bonds in the new compounds.

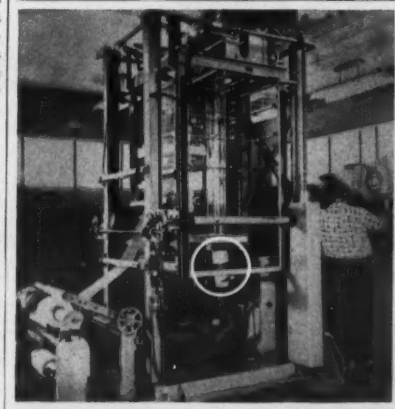
A mixture of mono- and disodium acetylides —made from metallic sodium and acetylene— are alkylated with α,ω-dihalides to yield linear and cyclic polyynes:

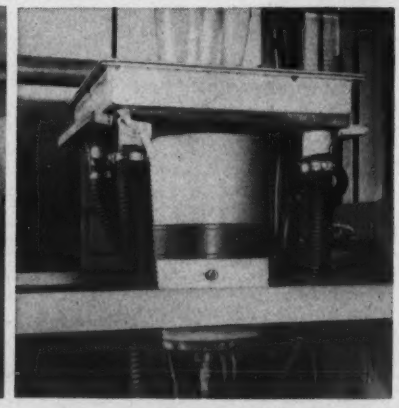
$$X(CH_2)_nX + \begin{matrix} Na-C\equiv C-H \\ Na-C\equiv C-Na \end{matrix} \longrightarrow$$

$$H-C\equiv C[(CH_2)_nC\equiv C]_x H + (CH_2)_n \begin{matrix} -C\equiv C- \\ -C\equiv C- \end{matrix} (CH_2)_n$$

In the reaction, the monosodium acetylide performs the function of chain stopper to control the formation of high molecular weight polyynes. Hydrogen-terminated polyynes are assured by the presence of excess sodium acetylides.

Highest yields are obtained by reacting dibromides at the boiling point of ammonia (−33.4°C), or dichlorides at elevated tempertures under autogenous ammonia pressures.





Polyethylene tubing has improved clarity and gloss when produced with new U.S.I. annealing chamber technique. Close-up view at right shows "chimney" between extruder and air ring.

★ U.S.I. CHEMICAL NEWS ★

CONTINUED

Polyethylene

Work on this new technique is continuing at the U.S.I. Polymer Service Laboratory, where your inquiries are always welcomed. If you have special problems, U.S.I. engineers will gladly offer their assistance. You are also invited to write for a Technical Data Sheet describing the new process.

Anhydrous Alcohol-Freon Blend Developed to Clean Printed Circuit Boards

To clean printed circuit boards rapidly, safely and easily during production, a special solvent formulation has been developed which is claimed nonflammable, nonexplosive and low in toxicity. It is made up of a "Freon" solvent and a specially denatured anhydrous alcohol with an initial boiling point of 43°C.

The blend is said to clean oil, grease, excess rosin flux, fingerprints and other dirt from the boards after soldering and other assembly operations are finished. It can be used with semi-automatic cleaning equipment or in simple hand-dip baths. Reports indicate that it does an effective job without damage to circuit components, laminating cement, or most color coding and labeling on circuit parts.

Since the formulation is a blend of solvents, fractionation of the mixture will occur due to a higher evaporation rate for the lower boiling Freon component. Therefore, with continuous, automatic cleaning in a system which recovers or reclaims solvent vapors, the composition of the mixture must be checked from time to time.

For small-scale cleaning in a static bath, two-minute immersion of the board, with slight agitation, is said to be generally adequate for satisfactory cleaning. Four-minute immersion, with slight agitation, was the maximum time required to remove any type of soldering flux during test operations.

Molded Polyethylene Liner In Steel Pail Available For Chemical Shipments

A seamless, blown-in-one-piece polyethylene liner for a steel pail has been developed as another advance in solving the problem of safe and economical packaging of corrosive liquids. This container is expected to find wide application in packaging and shipping products such as acids and alkalies, food concentrates, photographic chemicals, electrochemicals and insecticides.

The result of over two years of research and development work, the package has been approved by the Bureau of Explosives to carry certain corrosive, poisonous and flammable liquids under ICC-37P specification. It has been successfully subjected to vibration and drop tests from 0°F. to 125°F.—tests more exhaustive than those required by ICC and Federal specifications.

The liner is blow-molded of polyethylene in the same manner as a "squeeze bottle," and is then attached to the cover of the outer steel container at the pouring opening, before it is inserted in the container. Its one-piece construction is said to insure against leakage and product contamination.

(*Photo courtesy Jones & Laughlin Steel Corp.*)

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

New journal now being published on mathematical analysis and applications. Said to permit rapid publication of selected mathematical papers on classical analysis and applications in fields such as physics, chemistry, biology. **No. 1560**

Plastic laboratory equipment now available, from aprons to Y-connectors, covered in new catalog just issued. Plastics represented include polyethylene, styrene, teflon, nylon, polypropylene, acetates, acrylics, vinyls. **No. 1561**

Rigid, fire-resistant polyurethane foams can now be prepared from new alkyd resin system which used trichlorofluoromethane as foaming agent. Said to be of interest for cores in sandwich construction, insulation applications. **No. 1562**

Current projects of American Standards Assn. are described in booklet released recently. Covers 425 projects, categories and gives scope of each, provides index and lists sponsors. Whys and hows on standards outlined. **No. 1563**

Method of analysis of sodium hydride, for contained sodium hydride and residual sodium, covered in technical data sheet now available. Describes apparatus, procedure, offers technical assistance. **No. 1564**

Russian-English atomic dictionary, second edition, can now be purchased. Over 23,000 Russian entries cover nuclear science and technology, physics (theoretical, atomic, molecular), physics of solids, crystallography, math. **No. 1565**

Flash points of more than 4,500 trade-name liquids are listed in new reference index now being sold. Data include manufacturers' names, principal uses of products, and sources of information given. **No. 1566**

Metal cleaning chemistry and techniques discussed in 28-page handbook now available. Includes electro-, barrel, ultrasonic and machine cleaning, plus tank cleaning, with suggestions for tank design, layout, detergents. **No. 1567**

Instrumentation literature now being abstracted by new service. Claims to cover all significant articles of interest to chemical, petroleum, food, steel and glass fields. Abstracts journals, papers, patents, books. **No. 1568**

High frequency induction furnace can now be obtained which can operate in pure hydrogen or oxygen atmosphere up to 5,000° F. Makes use of zirconia and/or thoria pure oxide refractories, as susceptor or heating element. **No. 1569**

PRODUCTS OF U.S.I.

Alcohols: Ethyl (pure and all denatured formulas); Anhydrous and Regular Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL®M, ANSOL PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fusel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroformate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P.

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Intermediates.

Heavy Chemicals: Anhydrous Ammonia, Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions, Phosphatic Fertilizer Solution, Sulfuric Acid, Caustic Soda, Chlorine, Metallic Sodium, Sodium Peroxide.

PETROTHENE® ... Polyethylene Resins

Animal Feed Products: DL-Methionine, MOREA® Premix (to authorized mixer-distributors).

U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.

U.S.I. SALES OFFICES

Atlanta • Baltimore • Boston • Chicago • Cincinnati • Cleveland
Detroit • Kansas City, Mo. • Los Angeles • Louisville • Minneapolis
New Orleans • New York • Philadelphia • St. Louis • San Francisco

Tax depreciation article cited as impressive

Gentlemen:

We were impressed with the article ("Tax Depreciation Policy") by Thomas C. Davis in the September issue of CHEMICAL PROCESSING and would like to have your permission to reprint it in our company employee newsletter. This will be part of a program to educate our rank and file employees as to the "Management side" of potential political and economic problems.

We believe that a well informed public will vote intelligently and hope that in our small way our program will be fruitful.

MR. R. S. SUNDERLIN
Plant Manager
American Lithium Chemicals, Inc.
San Antonio 12, Texas

Another misused relative added to our list

Gentlemen:

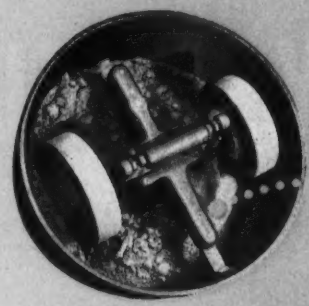
The letter from G. W. Greenwood in the October, 1959 issue of CHEMICAL PROCESSING concerning the "relative negative relative" suggests a criticism of another misused relative — this time on the positive side. Frequently an expression such as "ten times larger" is used where "Ten times as large" is implied, as borne out, for example, by subsequent calculations.

These two expressions are not identical. The first is larger than the second by one of whatever unit is being considered. For example, a box *ten times larger* than one which has a volume of two cubic feet has a volume of 22 cubic feet; on the other hand, a box *ten time as large* would contain only 20 cubic feet. That this is true becomes

For more information on product at left, specify 3791 . . . see information request blank opposite last page.

MIX-MULLER®

means CONTROLLED DISPERSION for dry solid materials



Model LF Mix-Muller
Manufactured to same standards as high production Mix-Mullers. Ideal for controlled mulling of small production batches or for laboratory or pilot plant.

Now you can put it to work for less than $1600

If you're coating a fine dry material; blending liquids into a dry powder . . . or dispersing a small amount of one material into another—you need *more* than a simple stirring, tumbling or agitator action can *give*.

You need *controlled dispersion*. You get it with Mix-Muller . . . a unique three-way kneading, smearing, spatulate action that actually coats one material with another. It's an intensive but thoroughly controlled *mulling* action which slashes waste by eliminating the need for reprocessing and remixing. By making the *most* of prepared ingredients, Mix-Muller can turn problem mixing operations into a new source for *profit*.

That's a big order in these days of expensive raw materials. But it's exactly why more and more processors, caught between demands for optimum quality, soaring costs, and outdated mixing facilities, are turning to Mix-Muller.

Can you afford to settle for less than *controlled dispersion?* The new LF Mix-Muller, quoted here, can make it easy and inexpensive for you to *find out for yourself*, under your own conditions. Why not write for a formal proposal?

See our advertisement: CHEM. ENGINEERING CATALOG

SIMPSON *MIX-MULLER*® DIVISION
National Engineering Company
640 Machinery Hall Bldg. • Chicago, Illinois

P 660

PRICE . . .
$1,549 FOB Chicago*

¼ to ¾ cu. ft. capacity. Comes equipped with 1 HP motor and starter, V-belt drive, removable dust hood, crib and muller scrapers, liquid additions funnel, integral base for bench mounting and 4 pipe legs for floor mount. No foundations necessary. Has machined crib and mullers; discharge is automatic, by bottom door.

**Same in stainless steel $2,850*

WRITE FOR HANDBOOK ON MULLING

Check 3792 opposite last page.

Powell Valves control the flow of the propellant fuels in storage and into the missile.

Powell engineers and metallurgists have met this newest valve challenge of our time—by perfecting precision, flawless, never-failing valves for the ground support equipment of our Nation's guided missiles and rockets.

Since 1846, the Wm. Powell Company has been manufacturing vital valves to fill the needs of all industries and reach brave new worlds.

You can count on Powell Valves at the "count-down" in your industry for handling water, oil, gas, air, steam, corrosive fluids, or fuels. Contact your nearest Powell Valve distributor. And for complete information on Powell Valves in the United States missile program, write directly to us.

● world's largest family of valves

POWELL VALVES

THE WM. POWELL COMPANY • DEPENDABLE VALVES SINCE 1846 • CINCINNATI 22, OHIO

Check 3793 opposite last page.

apparent when we consider unity. A box which is *one time larger* (once again as large) than another is also *twice as large* as the second.

MR. P. S. BAKER
Superintendent
Isotopes Sales Department
Oak Ridge National Laboratory
Union Carbide Nuclear Company
Oak Ridge, Tennessee

Chemical Boobytraps

Sirs:

Again CP has initiated a fine series in "Chemical Boobytraps." If but one tip should spark a flame to help someone prevent a serious accident, your time will have been well spent.

Due to value of these articles I am cutting them out for file. Possibly you could arrange them like "Processing and Engineering Data" to facilitate their removal.

DAN R. BLANKENSHIP
The Central Pharmacal Company
Seymour, Ind.

Asks OK to reproduce article on politics

Gentlemen:

An article entitled "Time is Ripe for Businessmen to Become 'Politically Sophisticated'" appeared in the October issue of CHEMICAL PROCESSING magazine (page 26). We would like to have your permission to reproduce the article for use locally in our Practical Politics course.

I would appreciate it if you could let us know as soon as possible if this permission can be granted.

R. E. CURTIS
Education and Training
General Electric Company
Hanford Atomic Products Operation
Richland, Wash.

(*Editor's Note: Permission granted.*)

Why They Read CHEMICAL PROCESSING **One of a Series**

As general product manager of Nalco Chemical Company, Bob Rydell has broad responsibilities. Hence, broad nature of CHEMICAL PROCESSING's editorials and advertising make it a publication of keen interest to him

CP gives reader market information

In addition to Chemical Materials section, articles on equipment catch his eye since they very often provide another perspective on market information — also likes general business articles, similar to those on the Food Additives Amendment

Value of the industry-wide nature of CHEMICAL PROCESSING — covering articles on chemical materials and equipment, as well as on the administrative management side — is shown in comments of a CP reader, R. G. Rydell, General Product Manager, Nalco Chemical Company.

Although Bob's main interest is in marketing chemical materials, articles on equipment are also of prime interest to him. He says:

"An article or ad on equipment very often provides valuable application information. Then, too, in these days when reading time is at a premium — clear-cut, informative charts and diagrams are most helpful. CP is good from that standpoint.

"We are problem solvers and producers of intermediate chemicals. If a story discusses a problem, as CP often does, it never fails to set us thinking about whether one or more of our 300 products might figure in the answer.

"Articles on corrosion and processing problems are always of interest to me. Not to the exclusion, however, of many of the good general business articles. For example, I read very carefully the article in your December issue on packaging and the Food Additives Amendment. I am particularly interested in the article in this March issue presenting interviews with leading toxicologists."

As general product manager, Bob Rydell is in charge of eight departments, each of which is headed by a product manager. He coordinates marketing activities, including product development, sales promotion and certain market research in established fields.

Mr. Rydell has quite a few administrative responsibilities. He represents marketing on the Operating Committee of the Industrial Division. He represents the product departments on research planning. Coordination of product activity with advertising is another of his responsibilities.

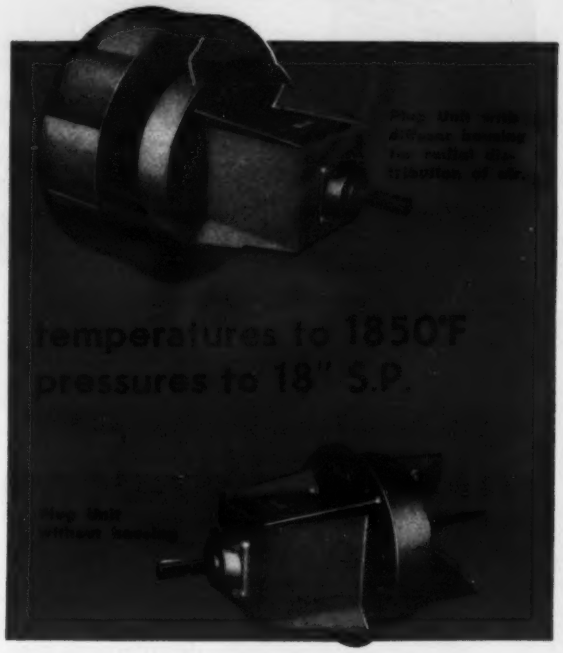
To next page

No duct work!

GARDEN CITY

Thermal-Aire

PLUG UNITS



Wheel is inserted directly into furnace, oven, kiln —need for duct work is eliminated. Mount in any position, at any suitable location. Can be installed with or without housing, depending on airflow efficiency required. "AIR-COOLED" Shaft prolongs bearing life, too; cuts maintenance and replacement costs. Costs less to buy, install, maintain; easily applied to new or existing installations.

WRITE TODAY for information on Thermal-Aire Fans and Plug Units Radial Blade . . . Forward Curve Blade

MEMBER OF AIR MOVING AND CONDITIONING ASSOCIATION, INC.

REPRESENTATIVES IN LEADING CITIES

GARDEN CITY FAN & BLOWER Co.

805 NORTH EIGHTH STREET, NILES, MICH.

Check 3794 opposite last page.

Corrosive attack here is terrific...

but TYGON® stops it in its tracks!

The extreme corrosive conditions found in metal finishing departments pose some of the toughest coatings problems for corrosion engineers. Here, pickling and plating equipment, as well as structural steel and fixtures, are under constant attack from fumes and spillage of corrosive acids and salts.

Wherever the going is roughest — on tanks, conveyors, ventilators, walls and ceilings — you'll find Tygon is usually the recommended coating. Why? Because Tygon Paint has a proven record of success against corrosion. Tygon lasts longer, continues to give protection in many cases long after other paints have failed, thus costs less in the long run.

Another important factor is that the broad Tygon line permits application of *specialized* protection against a wide range of specific corrosives and exposure conditions. If a vinyl-base coating seems best for the job, one of several Tygon formulations may be specified. If epoxy type coatings are required, Series "E" Tygon Epoxy Coatings offer excellent, long-lasting protection under the conditions for which they are recommended.

Try Tygon on your next stubborn corrosion problem. Bulletin 760 gives the complete Tygon Coatings story. Write for it today.

PLASTICS & SYNTHETICS DIVISION

U. S. STONEWARE
AKRON 9, OHIO

110-G

Check 3795 opposite last page.

Reader Profile

From preceding page

Bob Rydell has been with Nalco Chemical Company for eight years. Formerly he was with Wallace & Tiernan. He has a BS degree in Engineering from Purdue University.

Plastic hood improves readability of radar

Pilots of Pan American World Airways jet planes now can read their radarscopes at a glance while seated at the controls in normal flying positions, thanks to development of a plastic hood.

The hood is fabricated of black plastic and is unbreakable. It resembles a cross between a ship's binnacle and a deep sea diver's helmet.

Because of its shape, light is effectively blocked out. The black color absorbs stray light rays that enter the hood. The pilot thus sees a bright, clear image on the radarscope which he can read by simply glancing through the opening of the hood.

Tests have shown the plastic hood is adaptable to all types of radar-equipped aircraft. And it costs only a third as much as the old-fashioned, boot-shaped type.

30 million pounds of 'pull' with aluminum stretcher

Plate stretcher, installed in concrete pit 120′ long, 32′ wide and 15′ deep, can grip ends of 60′ long, thick, high-strength aluminum plate and stretch it by 4′.

Machine possesses pulling force of 30 million lb, and can handle aluminum alloy plate up to 6″ thick and 13-1/3′ wide.

Built for Kaiser Aluminum & Chemical Corporation by Hydraulic G.M.B.H., Duisburg, Germany, stretcher is used to refine internal structure of metal by equalizing stress distribution in heat-treated and welding alloys.

THAT'S INTERESTING

Astronaut's recorder

A 12 lb recorder which will accompany the first man into space has been delivered by Datalab to McDonnell Aircraft Corp. Unit is 11x13x3⅝" and requires less than 8 watts of power. It will record comments of astronaut and space, phenomena. Design and development cost was $135,480.

Detergents aid study

Sodium dodecyl sulfate and alkyl aryl sulfonate detergents are being used to remove nitrogen from plant materials in analyzing for protein, *Agricultural Research* reports. USDA researchers have extracted 92 to 95% nitrogen from beans and peas using aqueous solutions of detergents containing sodium carbonate, with no effect on other components.

For more information on product at right, specify 3796 see information request blank opposite last page.

RYKON *Grease*

passed this test at Corn Products Company

Situation: The springs in the grease chargers on expeller machines at Corn Products Company's Argo, Illinois, plant are under extra heavy tension. Due to this tension, oil formerly separated from the grease thickener in the grease cups. Bearings did not receive proper lubrication and the cups filled with grease thickener residue. The system needed cleaning every three months. Each time, large amounts of residue were found. Ten special-purpose greases were tried in an effort to solve the problem.

What was done: A Standard Oil lubrication specialist working with Corn Products' plant maintenance people recommended RYKON Grease #2 E.P. The system now needs cleaning only every six to nine months. Very little residue is found. Now RYKON Grease has become one of the important lubricating greases in use at Corn Products' Argo plant.

RYKON Grease is formulated with a unique non-soap organic thickener. The fibers of this thickener hold RYKON's fine quality base oil firmly in suspension. The grease resists water washing, high temperature and dirt contamination while providing superior lubrication to bearings of all types.

What you can do: Get more facts about RYKON Grease from the Standard Oil office nearest you anywhere in the 15 Midwest and Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 S. Michigan Ave., Chicago 80, Ill.**

You expect more from **STANDARD** *and you get it!*

Standard's Arnold Parus and chief lubrication foreman Henry Anderson take a look at expeller unit's grease system. Arnold Parus is well equipped through experience and training to work with plant men on lubrication problems. Arnold has a B.S. degree from Bradley University and three years' field experience in this kind of work. He has also completed Standard's Sales Engineering School.

Quick facts about **RYKON** *Grease*

- Heat stable. At sustained high temperatures, RYKON Grease remains soft and grease-like.
- Resistant to water washing.
- Mechanically stable. Minimum change in consistency in service.
- Resistant to oxidation. Thickener acts as inhibitor.
- Exceptional rust preventive properties.

MEETS RIGID SPECIFICATIONS

HARRISBURG CYLINDERS

Among the many reasons for longevity and dependability of Harrisburg cylinders are the rigid tests and inspections to which the cylinders are subjected.

For example maximum control of cylinder wall thickness is attained through the use of an XactRAY Gauge. This instrument is used to measure wall thicknesses throughout the length of the cylinder shell. In addition to the XactRAY gauge; Vidigages, Sonigages and Magnaflux Testing are available for use as required.

These instruments, of course, are supplementary to exhaustive I. C. C. inspections and tests which make possible effective control of wall thickness for minimum weight consistent with maximum service life.

More than a Century in Harrisburg 24, Pa.

H HARRISBURG STEEL CO.

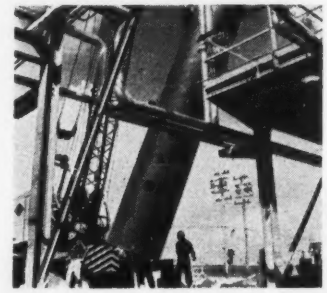
Division of HARSCO CORPORATION

TUBES TRANSPORTS FLANGES COUPLINGS

Check 3797 opposite last page.

Demand spurs Celanese to expand linear polyethylene facilities

Celanese Corporation of America demonstrated optimism in the future of linear polyethylene with recently announced expansion of capacity of Houston, Texas, plant to 50 million lb/yr. Houston plant, opened in March 1957, was among first to produce commercial quantities of high-density material in this country. Richard W. KixMiller, president, said demand for Fortiflex high-density polyethylene has developed so rapidly in 1959 that Celanese has been taxed to meet requirements. In anticipation of another sharp increase this year, Celanese expects to complete expansion program sometime this month.



Houdry Process Corporations' unit for production of triethylenediamine (Dabco) catalyst for urethane foams, coatings and elastomers is now in commercial production. Plant is located adjacent to existing Houdry catalyst manufacturing facilities in Paulsboro, N.J.

Union Carbide Plastics Company, division of Union Carbide Corporation, recently increased plant capacity at South Charleston, W. Va., for production of polyvinylethylether resins. Unit is now on stream. Although production figures were not announced, total output was estimated to be in millions lb/yr.

Monsanto Chemical Company has begun a major modernization of phenol production facilities at its William G. Krummrich plant, Monsanto, Ill. Final schedule calls for completion in mid-1961. Modifications will be accomplished without significant interruption of plant's operation.

National Aniline Division of Allied Chemical plans to triple annual production of Golden Caprolan nylon-6 yarn. Announcement follows close on the heels of expansion of caprolactam monomer capacity to 84 million lb. Nylon-6 yarn capacity increase includes a further substantial expansion of caprolactam production facilities.

Nitrogen Division of Allied Chemical recently announced new production facilities at Orange, Texas for manufacture of polyethylene glycols. No capacity figures were disclosed.

Polymer Industries, Inc., after completing half-million dollar production and laboratory facilities at Springdale, Conn., began work on additional construction of polymerization and solvent-mixing plant. These plants are scheduled to begin operations this summer. Estimated cost is $500,000.

Gulf Oil Corporation has completed and begun operations at multi-million dollar high-purity cyclohexane unit at Port Arthur, Texas. Plant will produce a high-purity grade of material especially adapted to manufacture of nylon.

Stauffer Chemical Company plans to expand capacity of aluminum fluoride plant of its Nyotex Division at Houston, Texas. Scheduled for completion this month, expansion will double Stauffer's aluminum fluoride production based on a fluidized-bed process.

Dixon Chemical Industries, Inc. has announced that Vulcan-Cincinnati, Inc. has been

To page 22

THAT'S INTERESTING

Built from top down

Huge dome-shaped structure — equal in height to 10-story building — was built from top down using air pressure only slightly greater than air we breathe. In erecting dome for Union Tank Car Company at Wood River, Ill., Graver Tank & Mfg. Co., a division, used pneumatic lifting diaphragm of vinyl-coated nylon, 1/32" thick.

Metering justice

Junking of presently used intoxication tests and adoption of analytical technique of gas chromatography is being advocated by Dr. Melvin Haley, California toxicologist. He uses a vapor fractometer, developed by Perkin-Elmer Corp., which gives three profiles of blood sample in less time than is now needed for one analysis.

For more information on product at right, specify 3798 see information request blank opposite last page.

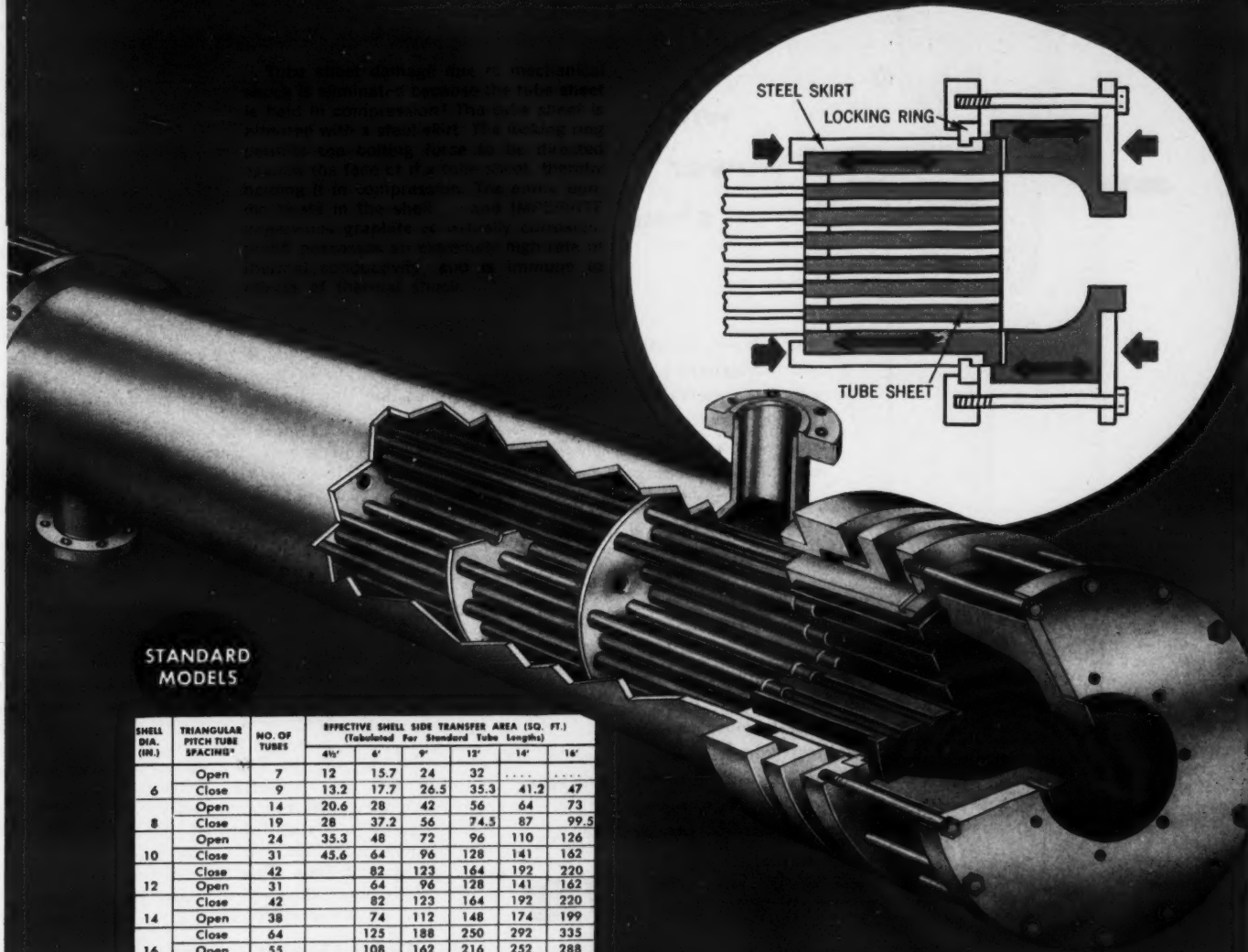
Only FALLS FI INDUSTRIES

IMPERVIOUS GRAPHITE

Tube and Shell Exchangers

feature

COMPRESSION HEAD DESIGN



STANDARD MODELS

SHELL DIA. (IN.)	TRIANGULAR PITCH TUBE SPACING*	NO. OF TUBES	EFFECTIVE SHELL SIDE TRANSFER AREA (SQ. FT.) (Tabulated For Standard Tube Lengths)					
			4½'	6'	9'	12'	14'	16'
6	Open	7	12	15.7	24	32	....	....
	Close	9	13.2	17.7	26.5	35.3	41.2	47
8	Open	14	20.6	28	42	56	64	73
	Close	19	28	37.2	56	74.5	87	99.5
10	Open	24	35.3	48	72	96	110	126
	Close	31	45.6	64	96	128	141	162
12	Close	42		82	123	164	192	220
	Open	31		64	96	128	141	162
14	Close	42		82	123	164	192	220
	Open	38		74	112	148	174	199
16	Close	64		125	188	250	292	335
	Open	55		108	162	216	252	288
18	Close	85		166	250	332	388	445
	Open	74		145	218	290	339	387
20	Close	109		214	320	427	500	570
	Open	92		180	270	360	420	481
22	Close	130		255	383	510	595	680
	Open	121		236	356	472	554	634
24	Close	163		320	480	640	745	850
	Open	151		296	444	592	690	790
26	Close	197		386	580	772	900	1030
	Open	170		333	500	666	778	890
28	Close	235		460	690	920	1070	1230
	Open	206		405	606	810	945	1075
30	Close	268		525	790	1050	1230	1400
	Open	241		472	710	944	1100	1260
34	Close	349		685	1025	1370	1600	1830
	Open	316		620	930	1240	1445	1650
38	Close	439		860	1290	1720	2010	2300
	Open	403		802	1200	1600	1845	2140

FALLS FI INDUSTRIES, INC.

31909 AURORA ROAD • SOLON, OHIO

Phone CHurchill 8 4343 TWX CV 720

SHEAR-FLOW

the modern mixer with power shearing

Finer, faster blending, dispersing and homogenizing is now possible with Shear-Flow's new Model RL Hi-Shear Head. Finely spaced dual impellers induce considerable shearing action and high pumping pressures that rapidly reduce particle size for superior material mixtures.

- Greatly reduces mixing time
- Uniform circulation—no vortex
- Emulsifies immiscible liquids
- Controllable flow pattern
- All parts stainless steel
- Chemically inert seals
- Handles viscous materials with ease
- No operating Torque
- Disperses, blends, homogenizes

GABB SPECIAL PRODUCTS INC.
Windsor Locks, Conn.

SHEAR-FLOW
GABB SPECIAL PRODUCTS INC.

☐ Have representative call
☐ Send more information

Name_____

Position_____

Co. & Address_____

Check 3799 opposite last page.

From page 20

authorized to proceed with design and construction of a plant for production of anhydrous hydrofluoric acid at Paulsboro, N. J. Construction period is estimated to be 12 months.

Miles Chemical Company, division of Miles Laboratories, Inc. has placed on stream semi-commercial plant for production of polymeric dialdehyde. Plant, located at Zeeland, Mich., has a capacity of 225,000 lb/yr. This capacity can be doubled within 60 to 90 days as needed.

Continental Oil Company plans to construct a petrochemical plant at Ponca City, Okla., which will have a capacity of more than 20 million gallons of cyclohexane annually. Plant, estimated to cost more than $1,000,000, will be constructed by Procon, Inc., with completion scheduled for this September.

National Cylinder Gas Division, Chemetron Corporation, has placed on stream its high-purity liquid oxygen facilities at Dallas, Texas.

Enjay Company, Inc. has announced that current modifications and expansions at Esso Standard Oil Company's Baton Rouge refinery will increase annual production of Enjay Butyl rubber to 38,000 long tons. Total capital cost of improvements now in various stages of design and construction will be $16 million. Of the new capacity, 20,000 long tons will become available by mid-year followed by 18,000 long tons in second quarter of 1961. This will increase total capacity to more than 135,000 long ton/yr.

Borden Chemical Company has announced initial production of acrylic emulsions at manufacturing facilities in Demopolis, Ala. New unit will add "substantially" to company's existing production capacity for these products. Borden also plans construction of polyvinyl chloride plant in Illiopolis, Ill., with total capacity of 40 million lb. Unit will involve investment of $4 million.

Oronite Chemical Company, subsidiary of Standard Oil Company of California, has had Badger Manufacturing Company begin construction of maleic anhydride facilities at Richmond refinery of Standard Oil Company of California. Completion is scheduled for mid-year.

Du Pont will build a sulfuric acid plant at its Houston works near La Porte, Texas. Multi-half million dollar unit will supply acid for company's caprolactam plant now under construction at Beaumont, Texas. Construction by Du Pont Engineering Department is scheduled for completion late this year.

Heyden Newport Chemical Corporation has engaged Scientific Design Company, Inc., to design and build maleic anhydride plant at Fords, N.J. Unit will have a capacity of 24 million lb/yr. Anticipated on-stream date is late this year.

Hooker Chemical Corporation's Phosphorus Division has approved plans for construction of a potassium phosphate plant at Jeffersonville, Ind. Scheduled to be in operation by mid-year, plant will produce primarily tetra potassium pyrophosphate.

Michigan Chemical Corporation and **Murphy Corporation,** joint owners of bromine plant near El Dorado, Ark., have announced that capacity will be doubled by early summer.

Pennsalt Chemicals Corporation will invest $500,000 in a new blending, packaging and warehousing plant at Atlanta, Ga. Scheduled to go on stream in the spring, plant is seventh unit devoted to Pennsalt specialties added in past five years.

Naugatuck Chemical division, United States Rubber Company, has more than tripled capacity of Marvinol vinyl-resin plant in Painesville, Ohio, since facilities were acquired a little over one year ago. Current expan-

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THAT'S INTERESTING

Drafting time cut

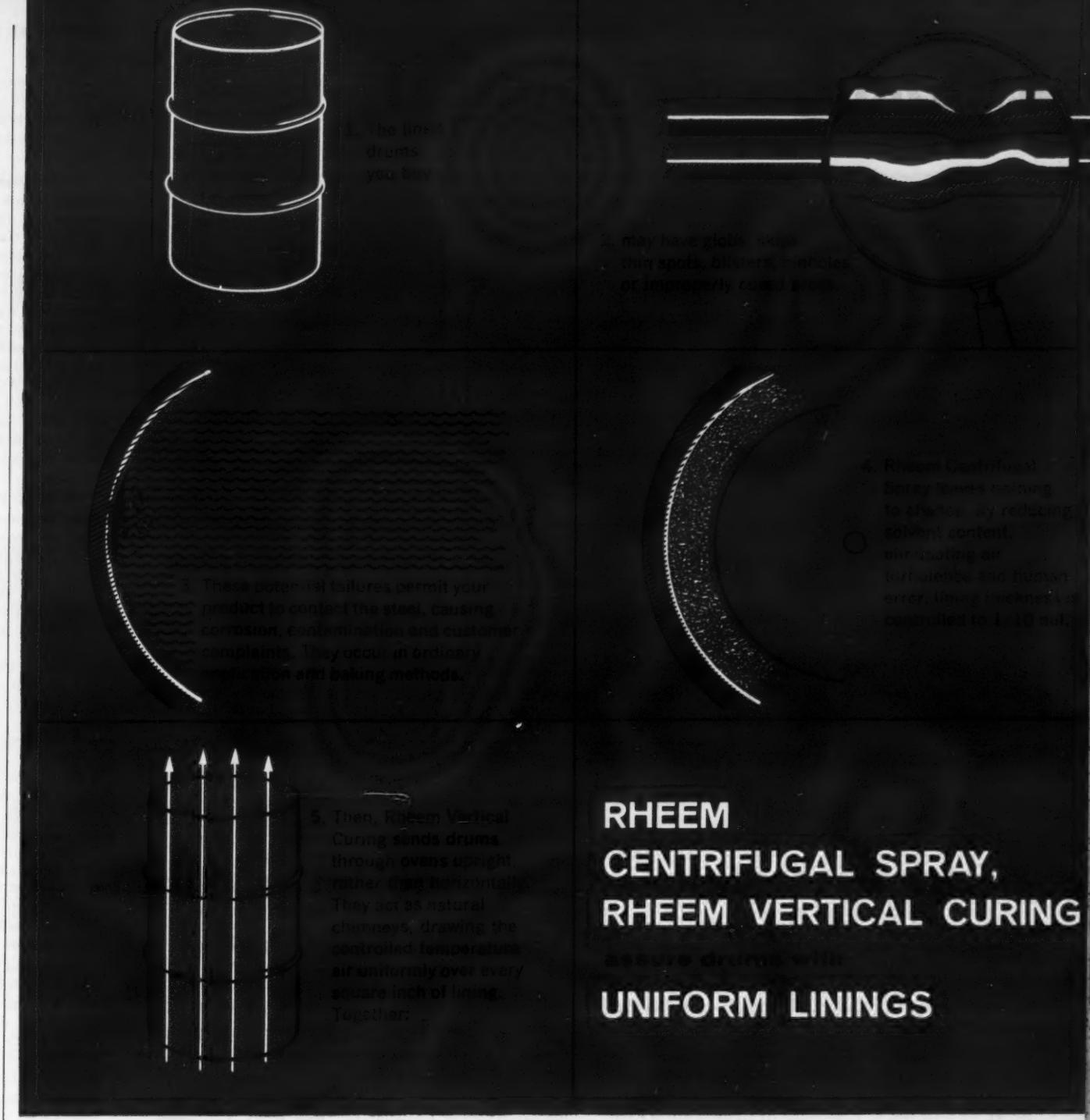
Photodrawings — photographs with engineering drawings or dimensional data superimposed — are being used to reduce drafting time in cases involving changes to existing facilities. Photodrawings provide accurate "as built" data, and are more easily interpreted by field forces.

Glue motor together

Glue a motor together? They might have said that it couldn't be done, but it has. About 75% of an outboard motor was glued together using an epoxy resin in an experiment at Marine Products division, McCulloch Corp. In test it ran for half hour.

Good buys!

Relatively speaking, you used 46 lb of caustic soda, 182 lb of sulfuric acid, 41 lb of chlorine, and 44 lb ammonia in 1959. If you don't recall making these purchases, don't worry. These materials were used in the things you did buy.



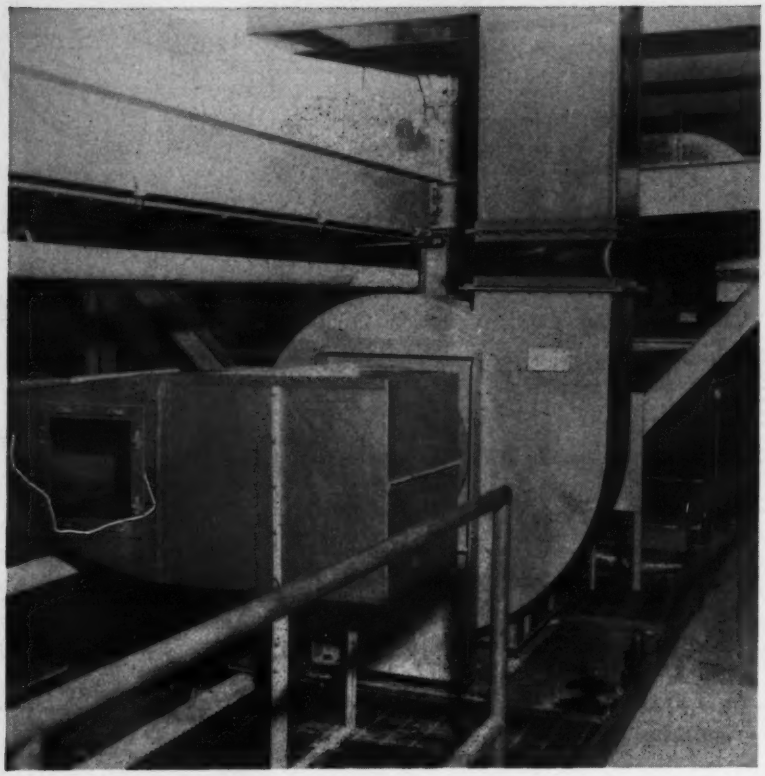
For more than three years, these unique developments have been providing the best in product protection, drum after drum after drum. For more information, or for help in developing a lining for a problem product, write the world's largest manufacturer of steel shipping containers at 1701 West Edgar Road, Linden, New Jersey. Plants across the country at Chicago, Houston, Linden, New Orleans, Richmond, Calif.; South Gate, Calif.; Tacoma. For other sales offices, see the Yellow Pages.

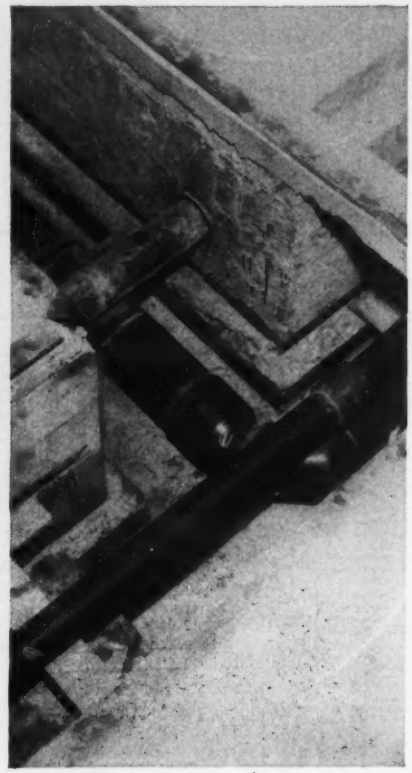
Rheem

Check 3800 opposite last page.

News about

B.F.Goodrich Chemical *raw materials*





Electrical manufacturer ends corrosion problem

. . . uses fume ducts and sewer pipe of Geon

This major electrical equipment manufacturer solved his maintenance problems and cut costs by installing ductwork and pipe made from Geon vinyl. Ordinary pipe or duct would create corrosion problems in no time —but Geon is unaffected by most causes of corrosion.

Sheet for duct use or pipe made of Geon vinyl is easy to use. Installation crews like it because it is so light in weight and easy to work with. Fittings, nuts and bolts of Geon vinyl are also available. Pipe can be joined by threading or solvent welding.

How can your plant gain from ductwork or pipe of Geon vinyl? Get more information today. Write Dept. GO-2, B.F.Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

Geon VINYLS

B.F.Goodrich Chemical Company
a division of The B.F.Goodrich Company

B.F.Goodrich GEON vinyls • HYCAR rubber and latex • GOOD-RITE chemicals and plasticizers

Check 3801 opposite last page.

CHEMICAL BUSINESS

From page 22

sion will bring plant's capacity to approximately 65 million lb/yr.

United States Steel Corporation plans to increase capacity of two coal-chemical facilities. Capacity for coal-tar distillation at Tennessee Coal and Iron Division's Coke and Coal Chemical Works in Fairfield, Ala., is being increased by more than 100%. Another facility is under construction at U. S. Steel's Clairton Works near Pittsburgh, Pa. Alabama unit is scheduled for completion by mid-year with Clairton Works plant scheduled to be ready in 1961.

Certified Proteins Corporation has announced completion of manufacturing facilities for sodium caseinate in Jersey City, N. J. Present capacity is six million lb/yr with facilities to increase output as demand dictates. Plant is reported to be first in the United States specially designed and built to produce this protein product.

Foreign Plants

Industrias Quimicas de Mexico, S. A., has begun construction of a plant at Morelia, Mexico to produce xanthates. Scheduled for completion early this year, facility will be first in Mexico to produce these products. Output will be adequate to supply total Mexican market.

Pigment-Chemie G. m.b. H. has been formed by Sachtleben A.G. of Cologne and E. I. du Pont de Nemours and Company for manufacture and sale of titanium dioxide pigments. Plant to be built at Homberg on the Rhine, West Germany, with an initial capacity of 40 million lb is scheduled to begin operation in about two years.

Fabrika Azotnih Dubriva has engaged Pintsch Bamag A.G. of West Germany to build a high-pressure sulfur removal plant at Pancevo, Yugoslavia. Plant is to be completed this year and is designed to handle gas flowing at rate of 2500 lb/Mol/hr.

AEC Patent Policies Kill Research Incentive

JEOPARDIZE U.S. NUCLEAR POWER GOALS

DR. LEE L. DAVENPORT, President
Sylvania-Corning Nuclear Corporation
Bayside, L. I., New York

About The Author

Dr. Lee L. Davenport is a graduate of Union College and the University of Pittsburgh. During the war he played a leading role in the development of radar at M.I.T.'s Radiation Laboratory. He later supervised the construction of Harvard University's Cyclotron.

In addition to being president of Sylvania-Corning Nuclear Corporation, Dr. Davenport is a member of the board of directors of the Atomic Industrial Forum, and member of the General Advisory Committee on Atomic Energy to the New York State Office of Atomic Development. He is also a director of Connecticut Instrument Corporation.

We had better take a fresh look at the AEC's program of patent policies if we want to achieve the goal of economic nuclear power expressed by our nation. There seems to be a strange inconsistency between this objective and the conditions under which it is to be met.

Only a few months ago, a number of companies were asked by the AEC to give up their applicable background patent rights in order to be considered eligible for a contract on the fuel cycle development program. Entirely alien to the principles upon which our patent laws were founded, such demands not only destroy all incentive for private invention and development, but also jeopardize a company's proprietary position — even with respect to rights developed with its own funds and without relationship to the AEC.

Title to inventions and compulsory licensing provisions are set forth in Sections 152 and 153 of the 1954 Atomic Energy Act. They were incorporated into the Act at a time when future growth of atomic energy was not well understood. The outlook now has changed. We have all come to realize what a technical battle is still ahead before we can expect a truly profitable industry. The early fear that some big companies might make a quick killing has passed.

Unfortunately, the harm which will be done by these provisions may not become apparent for five or ten more years. Even then, it will be hard to prove beyond a doubt that compulsory licensing has slowed our progress. However, we can argue today that a free patent system promotes progress. We have seen it work.

What seems to have been behind our congressional willingness to abandon this traditional system in the field of atomic energy? Why take a chance on a new system that provides almost no motivation, in so important a field as we believe this to be? This is a poor time for social and economic experiments!

Eight False Arguments

Here are eight arguments that have been presented to justify the sweeping powers inherited by the AEC:

1) A field so important to the future as atomic energy must be for all the people.

2) The Government is spending so much money in this field that the benefits must belong to the people.

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THE LAW

Here are pertinent excerpts from Public Law 83-703, The Atomic Energy Act of 1954, pertaining to the issue at stake:

"Sec. 152. Inventions Conceived During Commission Contracts.—Any invention or discovery, useful in the production or utilization of special nuclear material or atomic energy, made or conceived under any contract, subcontract, arrangement, or other relationship with the Commission, regardless of whether the contract or arrangement involved the expenditure of funds by the Commission, shall be deemed to have been made or conceived by the Commission. . ."

"Sec. 153. Nonmilitary Utilization.—

a) The Commission may, after giving the patent owner an opportunity for a hearing, declare any patent to be affected with the public interest if (1) the invention or discovery covered by the patent is of primary importance in the production or utilization of special nuclear material or atomic energy; and (2) the licensing of such invention or discovery under this section is of primary importance to effectuate the policies and purposes of this Act.

b) Whenever any patent has been declared affected with the public interest, pursuant to subsection 153 a. —

1) The Commission is hereby licensed to use the invention or discovery covered by such patent in performing any of its powers under this Act; and 2) any person may apply to the Commission for a nonexclusive patent license to use the invention or discovery covered by such patent, and the Commission shall grant such patent license to the extent that it finds that the use of the invention or discovery is of primary importance to the conduct of an activity by such person authorized under this Act. . ."

National STARCH and CHEMICAL'S

R & D leads the way to $52 million sales

JOHN MELLECKER, Editor-East

ONE day in the mid-30's, a young adhesives sales executive named Frank Greenwall walked into his boss' office and said, "If we could have a research team to help our customers find out what they really need, we'd sell more."

Last December 31, when totals were being rung up on the year 1959, National Starch and Chemical Corporation's board chairman, Frank Greenwall, had reason to feel his prediction had come true. With a go-getting research team of more than 200 serving as the backbone for an aggressive multi-industry marketing operation, NSC's sales have soared beyond the $52 million mark. This more than tripled the figure of only 10 years ago. Profits have grown even more rapidly. National . . . which added "and Chemical" to its name only in 1958 . . . further carries the distinction of being the world's largest manufacturer of industrial adhesives.

Packaging — a field that is skyrocketing — is NSC's major market. Just as NSC has contributed a great deal to the development of that market, packaging's growth has had a great deal to do with making it possible for the company to expand, both in volume and product diversity.

The packaging field is presently served directly by the company through its adhesives. Later, if developments continue to show promise, packaging films may be offered.

A market closely related to packaging is paper, second in NSC's volume. Approximately 80 lb starch are consumed in production of each ton of paper. Among starch's functional uses are as a sizing to increase strength, and as a pigment binder to improve printing properties. An increasing trend favors use of NSC's synthetic resins for functional coatings, imparting grease resistance, low water vapor transmission rates, and attractive surfaces.

The food industry, third largest NSC market, is a large user of modified starches. Here subtle alterations in primary properties of "cornstarch" enable food producers to attain clarity, gel-state, fluidity, and countless other qualities so important in a highly competitive field.

Further subtle modifications of the starch molecule and deft application of synthetic polymers have resulted in considerable penetration by NSC into the textile field. By concentrating strictly on physical properties, the company's products have found uses in processing of both natural and synthetic fibers.

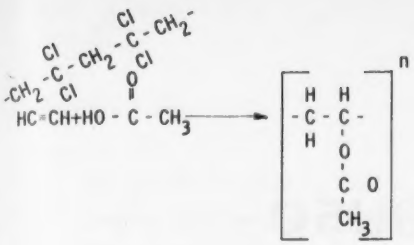
NSC has had striking success in the synthetic latex emulsion market, largely because of its emulsion research experience, and through its willingness to help the compounder correlate his results from using NSC latices. Recently the firm scooped competition with a zinc pigment compatible emulsion latice. Recognition of this discovery has been given by the American Zinc Institute. Although NSC expects others to come up with similar products, it believes an experimental lead time of about two years will assure its leadership for some time.

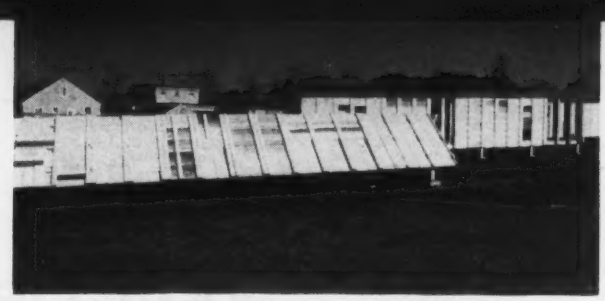
Popularity of plastic-covered furniture — particularly dinette sets — has offered another good outlet for both NSC's materials and adhesives know-how. The company's position in the furniture field has recently been strengthened by acquisition and development of facilities for manufacturing particle board. Already, NSC's research has spearheaded the launching of a new "super-fine" particle board, attractive as a core material for fine furniture, where the outer surface must be of a high degree of flatness.

Major Products

As the company's name implies, starches and chemicals are its major products. Today,

Among those solving customers' applications problems are (l to r) Dr. Albert Goldberg, associate research director; Dr. Carlyle G. Caldwell, v-p research; and Leonard Wood, product manager, Paper Division





Surface coatings outdoor test racks, Plainfield, N. J.

starches are largely modified . . . and most are "chemically modified." A pioneer at both manufacture and field application of these materials, NSC is recognized as the technical leader in the starch industry.

Chemically modified starches now comprise about two-thirds of NSC's starch sales. Of these modified starches, over half are products on which NSC has patents. Starches for food uses plus packaging adhesives provide a goodly share of the remaining starch sales income.

NSC's "chemicals" are synthetic resins, largely polymers in emulsion form. Most of these are vinyl compounds. NSC is the second largest producer of polyvinyl-acetate, PVAC.

Packaging adhesives are split about equally in volume between those based on starches and those based on synthetic resins. These latter include a chemically modified casein sold for labeling, and an improved basic dextrine for non-curling front-seal envelopes.

At present, NSC has assigned to it about 30 U.S. patents covering both materials and applications. An equal number of British and Canadian patents cover the same subjects. For some time an accelerated program to develop patents has been under way; about 40 U.S. applications are now in process.

Important Breakthrough

NSC's research v-p is Dr. Carlyle G. "Corky" Caldwell, a genial scientist who did his doctorate research on starch under a Corn Industries Research Foundation fellowship. One of the important breakthroughs in the history of starch modification technology took place in 1956 under Dr. Caldwell's direction. This was the invention of "Cato" cationic starch. Working on the basis of two-way communications, Caldwell's research team heeded word from product development people in the paper field to the effect that if a starch molecule of stable negative polarity could be commercially produced, it might improve starch's attraction to, and retention by, cellulose fibers. In five short months, Caldwell and team had 1) developed such a starch in the laboratory, 2) proved through field tests that starch retention was increased from 5 to 90 percent (when added to beater stock) and 3) developed a commercial process for manufacture of Cato. At a modest three times the cost of regular starch, Cato soon largely displaced "regular" starch from paper sizing.

A fascinating side to Caldwell's career is his work with geneticists in development of special hybrid corns. National Starch and American Maize-Products Co. have co-sponsored work in this field that has to date produced noteworthy results.

Basically, genetic research on inbred corn species is undertaken because it is more economical to grow corn containing a desired concentration of a particular starch, than it is to separate such a starch from a natural mixture.

Ordinary corn contains about 75% "amioca" — or amylopectin — branched glucose polymer starch. Amioca is highly soluble, produces a clear, stable gel, and is highly preferred as a food thickener or bodying agent.

The other 25% content of ordinary corn is "amylose" linear glucose polymer starch. The amylose fraction is the least stable in solution of naturally occurring starch materials. It can be stabilized, but is not currently regarded by the food industry as a replacement for amioca. It can be readily insolubilized by cross-linking, and offers exciting promise as a material of future importance for films, which though relatively insoluble are readily digestible by the human body's enzymes!

Amioca Developed

As World War II loomed, tapioca, a widely used and highly valued starch, was seen to be no longer available from its principal source — the Far East. To make our nation independent from such import restrictions, National Starch and American Maize-Products sponsored a project to develop what was to be known as "Waxy Maize." The first commercial crop was produced in 1944. Since then, amioca has succeeded in taking over much of the specialty market held in the past by tapioca.

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Research & Development Committee, which for all practical purposes serves as NSC's executive committee. (l to r) Dr. Robert W. Merritt, v-p Manufacturing; Dr. Carlyle G. Caldwell, v-p Research; Donald D. Pascal, president; Frank Greenwall, chairman of board; James Dillon, senior v-p; and Sidney F. Thune, v-p.

Will Delaney Clause Make Food Safer?

. . . read what seven leading toxicologists say

John P. Frawley, Ph.D.
Hercules Powder Company

Each year hundreds of deaths are reported from food poisoning in the United States. These deaths are the direct or indirect result of improper preservation and storage of food. In contrast, only one death has been reported from the ingestion of a chemical additive in food, and this in 1959 from the misuse of sodium nitrite in fish.

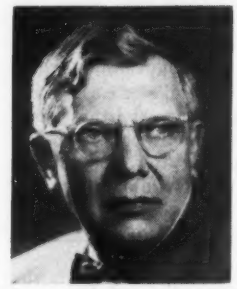
The Food Additives Amendment of 1958 was designed to prohibit the use of an intentional food additive until the government is convinced it is safe. Since a distinction between purposeful and unintentional addition of a substance to food had no bearing on its safety, possible transfer from food packaging and other sources were included in the same legislation.

No one can challenge the basic intent of the law. However, a number of the provisions of the law reflect a general lack of perspective when the hazards of food additives are considered in relation to the other hazards associated with food, as deterioration, bacterial contamination, natural toxicants, nutritional inadequacy, etc.

For Hercules Powder Company, the amendment will mean an investment of between $500,000.00 and $1,000,000.00 for investigations to reaffirm the safety of established products used in food packaging alone, some of which have been used since before the enactment of the first Food and Drug Law in 1906, without any suspicion of hazard to health either then or now. Beyond the economic consideration, the amendment will discourage process improvement and new product development, as well as divert a countless number of man hours from creative research.

Hercules will make every effort to comply with the requirements of the law even though our principal problems concern food packaging ingredients which may migrate to food under unusual conditions, and even then at insignificant levels, but which must comply with inflexible legislative and regulatory requirements primarily designed for intentional food additives. Strangely enough, it is more costly and difficult to obtain approval for 5 parts per million migration of a chemical from a cereal box, than the intentional addition of 5000 parts per million of the same chemical to the cereal itself.

Although other incongruities exist under the law, the problems created for food packaging are unnecessarily complex. We are hopeful, however, that this will be resolved soon by the issuance of separate interpretative regulations dealing with the specific conditions of incidental food additives. Such regulations would permit the use of a chemical *without* tolerance and *without* a practical analytical method for the chemical in food, provided the incidental use itself can be shown to preclude its occurrence in food at a level in excess of a safe level. Such interpretation is permissible under the law since tolerances are required only when necessary to protect public health.



Henry F. Smyth, Jr.
Mellon Institute and Union Carbide Corporation

Now that the Amendment of 1958 is fully effective, except for last minute extensions, one can look back more calmly upon the uncertainties which followed enactment. The bill had wide scientific support, and as it was reported out in August 1958, it promised a sound Act, assuring the consideration of objective facts and informed scientific opinion. It called for weighing the safety of intended use, not the *per se* properties of additives. Use of the word component in place of ingredient, suggested that trivial and inconsequential amounts in food were not intended to be covered.

It is true that only 18 months was provided for proof of safety where there was no general recognition, while 30 months is the least that would be required, but in other respects it seemed scientifically sound. Even the last minute insertion of the unscientific cancer clause was said by both FDA and the Senate Committee to be a redundancy, adding nothing substantive.

Eighteen months later we find the bill to be full of ambiguities. Interpretations have partly superseded scientific views, and have been complicated by unfortunate delays. It required 14 months to determine that the manner of use of 182 components out of many hundreds being utilized, was generally recognized as safe. Is it any wonder that industry could not determine which long-used ingredients might require additional study?

There is room for disagreement between scientists and administrators about each new "incidental" food additive, whether the amount reaching food is inconsequential, essentially zero, or whether it becomes a component of food. If such additives are always to be ruled components, only a most promising future can justify undertaking the proof of safety and the development of an analytical method for enforcing a tolerance.

The cost may exceed half a million dollars, particularly if new testing patterns now under discussion should become re-

This question is raised by some of the country's outstanding toxicologists in commenting on the Food Additives Amendment which becomes fully effective on March 5, 1960. They also point out that the new law will discourage process improvement and new product development, cause delays of up to three years, and divert technical resources from work that would be of more value to the public

quired. High cost is quite irrelevant if it will assure safer foods, but there is no reason to believe they were not already safe. It is debatable whether the removal of various materials from foods by recent administrative action and publicity campaigns has actually increased the safety of the food supply.

C. Boyd Shaffer, Ph.D.

Director of Environmental Health, American Cyanamid Company

Our Company has operated under the pesticide amendment since 1954; hence, the provisions of the new law are not unfamiliar to us. Moreover, we have always cooperated fully with FDA in any area involving contact of our products with food.

Since we have been complying with the spirit of this law for many years, its enactment will not hamper our efforts. What does hamper us is the natural tendency of regulatory requirements to become more stringent each year, and a growing disposition to resolve issues by reference to adminstrative policy rather than by exercise of scientific judgment.

Compliance with the new law adds, in round numbers, $100,000 of expense and three years of delay to the development of a typical product. Whether all of this diversion of technical resources is truly in the interest of public health is something about which I, as a scientist, have serious reservations.

FDA has had adequate power for many years to deal with gross adulteration, and no amount of legislation is immune to willful violation. In its practical operation, the new law may be construed to extend consumer protection to a degree out of proportion to the reasonably anticipated hazard.

The problem of providing for an expanding population requires technological advances in the production, processing and distribution of food. It is possible that there may be subtle risks in these innovations, just as there may be in any line of human endeavor.

The public must be made aware that extraordinary measures are being taken to reduce such risks to a minimum, but that a state of utter and absolute safety is purely an abstraction. At some point, we must balance the time and effort involved against the likelihood of a return in terms of additional protection of health.

John A. Zapp, Jr., Ph.D.

Director, Haskell Laboratory for Toxicology and Industrial Medicine, E. I. du Pont de Nemours & Co.

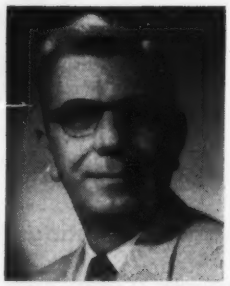
It has been the policy of the Du Pont Company over the years to carry out whatever toxicological investigations we and the Food and Drug Administration considered necessary to establish the safety of food additives and pesticides. Hence, passage of the amendment has made no change in our policy. Two changes in procedure, however, have occurred.

First, a formal procedure has replaced informal discussions with the scientific staff of the Food and Drug Administration as the method for reaching agreement about the safety of food additives. Second, passage of the amendment has greatly increased the amount of investigational work required to obtain approval for the use of a food additive.

In my opinion the increase in requirements for formal approval of food additives under the amendment is the chief factor responsible for the lag in establishment of food additive regulations.

On the other hand, do these increased requirements make the food supply safer? Perhaps so on theoretical grounds but the fact remains that the procedures used over the past decade have been adequate when intelligently applied.

I believe, therefore, that the increased requirements for formal clearance of food additives under the amendment do not make a proportionate contribution to the safety of the total food supply. I would prefer to see more materials studied as they have been in the past than to see staff and facilities tied up in the more exhaustive exploration of a few materials.



Joseph F. Treon, Ph.D.

Manager
Biological Sciences Section
Atlas Powder Company

For some years Atlas has had an extensive testing program designed to establish the safety and usefulness of its food additives under conditions of recommended usage. The number and kind of tests applied to each additive have been ample, in our opinion, to establish safety at the recommended use-levels, and usually exceeded Federal requirements.

For some additives the new

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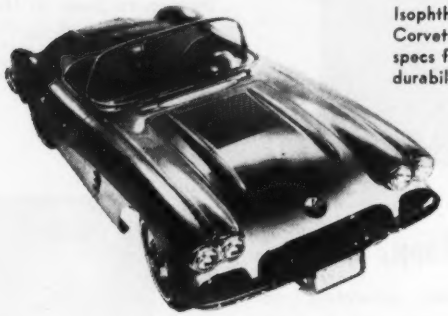
Isophthalic acid's road to success . . .

From test tube to profit maker

Ten years ago, Oronite Chemical Co., a subsidiary of Standard Oil Company of California, was removing o-xylene and p-xylene from its crude xylene stream. This left a fraction rich in m-xylene. Separation of my-xylene from this m-xylene-rich stream with subsequent oxidation to isophthalic acid seemed a natural step.

In the little over three years since commercial plant went on stream, Oronite has turned isophthalic acid into a well known entity in plastics manufacturing, with a growth curve that is flying happily skyward.



Isophthalic-based resin in Corvette body meets rigid specs for impact resistance, durability and weathering

Exploiting Superior Performance

With a backlog of several years of experience in isophthalic acid, Oronite is now concentrating its marketing efforts around these properties.

Reinforced Plastics: Isophthalic in resins, as a binder for glass fiber, gives reinforced plastics high strength, improved temperature resistance, greater resistance to impact, better all-round durability, and retains these properties longer than orthophthalic-based materials.

Molding Compounds: Wide range of compositions possible with diols, diamines, hydroxyamines — most having unusually high melting and heat distortion temperatures.

Films and Fibers: Many isophthalic-based high polymers for molding compounds also suitable for films and fibers. Some are crystalline, others amorphous. Low cost is a major advantage.

Plasticizers: Dioctyl esters of isophthalic most widely used. In PVC, they provide outstanding lacquer-mar resistance and low volatility, excellent light stability, electrical properties, resistance to water and oil, good low-temperature characteristics.

Foamed Plastics: Some isophthalic polymers, modified with diisocyanates, suitable for foams. Wide range of flexibility possible. Isophthalic foams are tough, and rigids have high compressive strength.

Coatings: Unsaturated isopolyesters used for molded-in-place coatings on reinforced plastics; clear and colored isopolyester formulations have large potential as anti-corrosion maintenance coatings. Conventionally applied coatings made with oil-modified isophthalic alkyds also used on many plastic materials.

How did it happen? Here's a profile of the ups and downs of marketing an unproven chemical product in a field besieged by new products.

Oronite had one enticing advantage at the start — unlimited raw material at hand. However when a small amount of isophthalic was evaluated in the laboratory a preliminary report stated "the potential is definitely limited."

True to story-book form, however, the project persisted. The more isophthalic was investigated, the broader its potential became.

Chemists at California Research Corporation, also a subsidiary of Standard Oil of California, took small quantities of isophthalic acid to Reichhold Chemical Co. and to Fuller Paint Co. for evaluation. Slowly, the project gained momentum.

Early Market Research

Once material was on hand to sell, where would the market lie? Market research disclosed five areas of interest:

1. Surface coatings
2. Polyesters for reinforced plastics, and molded products
3. High polymer products
4. Plasticizers for polyvinyl chloride
5. Foamed urethanes

Of these five possibilities, first two offered greatest immediate potential. It was job of Cal Research to explore properties of isophthalic resins on which the sales approach would be made.

As desirable properties were found, it would become the job of marketing divisions to exploit these properties with potential users.

In May 1954, management made the decision to proceed from pilot to a commercial plant. Facilities capable of producing 50 million pound/year were opened in January 1956. A perplexing complexity of production problems threatened to sink the entire project. However production quantities were achieved and marketing became the new headache.

Appraising Markets

Each market for isophthalic acid demonstrated its own peculiarities.

In alkyd field, total market promised to be tremendous, and ready made. Marketing objective was to gain a steadily increasing share of alkyd resin business.

Attaining this objective was complicated by several factors. One was that by sheer volume, paint companies had been swamped with latex research and production problems. Oronite marketers found that it was impossible to convince production personnel of paint manufacturers to try a new material, unless they could be shown exactly how to "cook it" in their plant.

Another complicating factor was technological research. With over 300 producers actively competitive in paint field, most companies could not afford research staff and time necessary to evaluate new materials extensively. Most research became trouble shooting, leaving new material formulation largely in lap of the producer.

For instance, number of variables possible in formulating alkyd resin paints is over 20. On top of that, add climatic and regional differences which must also be

Oronite president, T. G. Hughes, oversees isophthalic's soaring growth pattern

Reinforced polyester coating, here being applied to tank bottom, cuts costs, is expected to last life of tank

evaluated for each formulation.

To paint producers, isophthalic acid represented a departure from known routine. It had different melting characteristics and solubilities than commonly used phthalic anhydride. Manufacturers faced with this complexity of variables were reluctant to upset their existing formula balances.

This field response called for another management decision — build pilot kettles at Cal Research and learn paint formulation technology.

In selling isophthalic acid for resins, a slightly different approach developed. With resin manufacturers, properties of isophthalic acid were demonstrably superior to orthophthalics being used. Here, problem became one of finding those properties which each resin producer considered most important, then developing formulations which would give him these properties.

Polyesters are now in a growth and expansion phase. Though total market is much smaller than in alkyds, it is a dynamic market which may surpass realizable alkyd potential.

In both cases, Oronite technical service department became a keystone for the entire marketing program.

In spite of the growing technological reservoir being built up, sales force found that there was a great disparity between knowledge in Cal Research Labs, and in customer's hands.

Technical Service In Field

To correct this disparity, teams of chemists held seminars for Oronite's customers in cities across the country, explaining benefits and properties of isophthalic acid, and answering questions. Simultaneously, Oronite began an educational approach by direct mail. A mailing series entitled "Iso-phacts" presented information on isophthalic applications.

Next, Oronite and Cal Research men spent weeks in making personal visits to customer's plants, holding seminars in individual companies, and finding out more about what properties customers wanted. Sample resins and suggested formulations were presented.

An important and continuing function of the technical service department is the evaluation of isophthalic acid with other available resins.

Pricing Dilemma

Early in the marketing picture, difficult pricing decisions were encountered. On one hand, price could be on the high side of its probable range to concentrate on serving mainly the top of market. This would be the area where benefits were clearly demonstrable. On the other hand, by establishing prices at low end of probable scale, faster growth and bigger volume would be encouraged.

Pricing considerations in comparison with phthalic anhydride had to consider mol difference as well as price-per-pound differential. Final decision was to price isophthalic acid just slightly higher than phthalic anhydride on a use basis.

Future Growth

Commenting on problem of marketing a new and unproven chemical material from test tube stage to an eventual niche on profit and loss statement, Bob Stephenson, isophthalic product specialist, summarizes Oronite's position as follows:

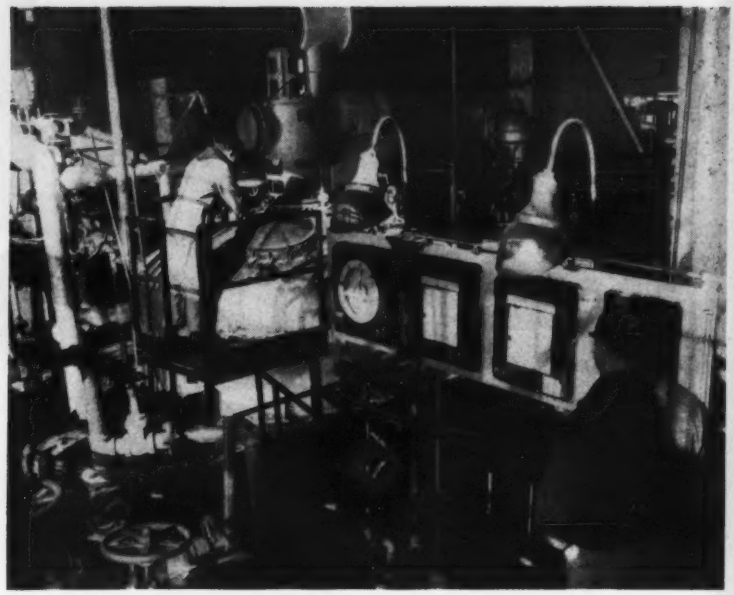
"Once you have the raw material available and technology built up, it becomes a problem to convince customers to try the material.

"This can be done by demonstrating to the customer performance properties which benefit him. If, after demonstrating these benefits, you can pass on technology which permits him to use your product effectively, you have a complete marketing package.

"After several years of market development, Oronite now has this complete package for isophthalic acid, with a large and growing backlog of basic and applied knowledge. There were times when the future looked bleak for isophthalics, and this goal appeared far off. Now our marketing base is well established and you will be seeing rapidly increasing amounts of isophthalic-based products in the future."

This feeling is reiterated by one of the strongest boosters

To bottom of page 40



Peroxidol installation at Reichhold Chemical, Inc. utilizes ion exchange resin as an epoxidation catalyst

By minimizing undesirable side reactions and upgrading final product quality . . .

Ion Exchange Catalysis Benefits Epoxidation Reactions

T. W. PALMER and ANDREW W. HART,
Technical Service and Development
Dow Chemical Co., Midland, Mich.

Utilization of strong acid cation exchange resins eliminates or minimizes disadvantages of mineral acid catalysis in expoxidation reactions.

Chemists have long recognized the desirable properties of epoxidized materials. Epoxide ring configuration, being highly reactive, offers excellent possibilities as a chemical intermediate.

Epoxidation of unsaturated vegetable oils yields plasticizers possessing unique advantages over other type materials. Such plasticizers markedly increase resistance of polyvinyl chloride resins to discoloration by heat and light. Here, epoxy groups of plasticizers function as scavengers for hydrogen chloride formed during the degradative process. Epoxidized plasticizers are also used to impart low temperature flexibility and permanence.

Epoxidation by conventional methods — by use of mineral acid catalysts or preformed peracetic acid — presents formidable disadvantages, however. Mineral-acid-catalyzed reaction is a batch operation using a charge comprised of unsaturated oils, hydrogen peroxide, acetic acid and catalyst (usually sulfuric acid).

Acetic acid and peroxide react to form organic peracid. Here, epoxide ring is susceptible to hydrolysis, acetylation, and other undesirable reactions, and epoxide yields are likely to be low. Also, mineral acid must be neutralized and removed from the product by washing or other means. Use of preformed peracetic acid eliminates side reactions and low yields. However, peracids are rather unstable and therefore present certain handling and storage problems.

Today numerous epoxidized oils are available commercially, some 25-million pounds being consumed annually in the manufacture of plasticizers and stabilizers.

Because ion exchange resins contain acidic or basic active groups they may be used in place of aqueous solutions of conventional acids and bases to catalyze reactions. A number of advantages over such acids and bases are offered by these resins.

1—Resin is easily separated from the reaction mixture after the reaction is completed.
2—Catalyst does not require neutralization.
3—Side reactions may be eliminated or considerably reduced.
4—Resin may be used many times, usually without regeneration.
5—Product yields are often increased and reactant efficiency improved.
6—Corrosion due to acid catalysts is sharply curtailed.
7—Volatile products, or those sensitive to acids or bases, can be separated from the resin before becoming charred or otherwise damaged.

Epoxidation of unsaturated fatty acids, fatty acid esters, and hydrocarbon represents an outstanding catalytic application for ion exchange resins.

"In situ" method developed in 1954 by Du Pont is probably simplest and best technique. It consists of agitating resin catalyst with hydrogen peroxide, acetic acid, and oil to be epoxidized. Peracid is formed in reaction vessel and used immediately for epoxidation. Epoxide yields of up to 90 percent are possible.

Resin may either be employed as an expendable catalyst or recovered and reused. Expendable technique utilizes 1-3 percent of resin based on the combined weight of the other reactants. At the end of reaction, catalyst is discarded. Reuseable technique utilizes 8-10 percent of resin. This technique offers somewhat higher reaction rates than the

former. Resin is recovered from the reaction mixture by filtration.

Number of times resin may be used is dependent upon its heavy metals content. Standard resins, containing up to 200 ppm of iron, can be reused at most two times. However, recently developed resins, such as Dowex® 50W, which contain only a few ppm of iron, may be reused as many as 12-15 times and are competitive costwise with sulfuric acid. No regeneration is ordinarily required.

Utility of ion exchange resins as catalysts is dependent on their porosity, that is, their degree of crosslinkage. This porosity permits acetic acid and hydrogen peroxide to diffuse freely into the bead and contact acid sites. These sites catalyze formation of peracid, which diffuses out of the bead and epoxidizes unsaturated oil.

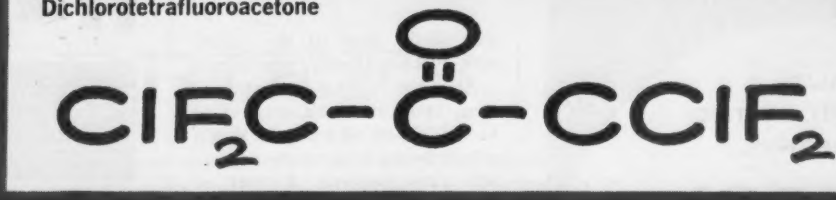
Porosity of the resin normally utilized, prevents at the same time, comparatively large oil molecule from diffusing into the resin bead. Thus, epoxide ring is effectively excluded from the acid sites, which catalyze ring opening and undesirable side reactions. If ring opening (hydroxylation) is desired, a resin with a lower-than-usual degree of crosslinkage may be utilized.

Among companies pioneering in the use of ion exchange resins as catalysts is Reichhold Chemical Company, of Elizabeth, New Jersey. Prior to 1955, Reichhold utilized sulfuric acid as a catalyst. Epoxidation itself presented no particular difficulties, but some product contamination

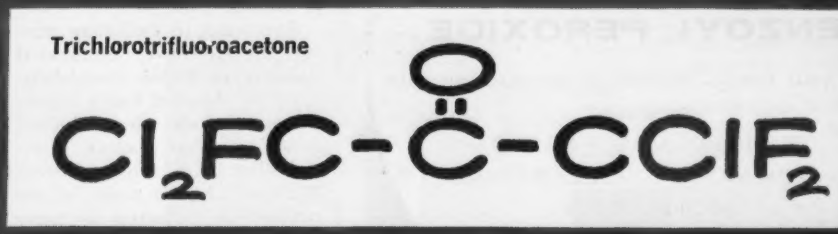
NEXT MONTH

Urethane foams by the "one shot" method step into the spotlight in this section next month. Polyethers vs polyesters, and how organo-tin catalysts helped unplug formulation bottlenecks, will be covered.

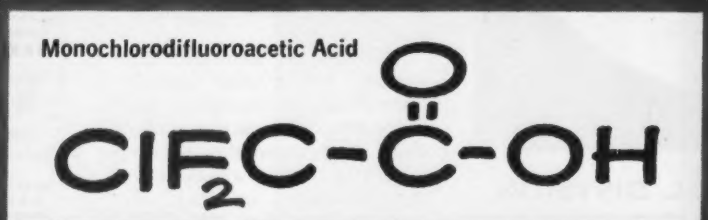
Dichlorotetrafluoroacetone



Trichlorotrifluoroacetone



Monochlorodifluoroacetic Acid



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did occur due to the usual acid-initiated side reactions.

Because of this contamination, epoxidized oil tended to break down during storage, result being a decreased epoxide ring content. Extent of breakdown was proportional to storage time.

Switching to exchange resin, Dowex 50W, eliminated stability problems completely. Product obtained has a higher initial epoxide ring content, hence displays better compatibility with vinyl plastics. Moreover, higher purity of the product is reflected in more stable plasticized films displaying less plasticizer migration.

Reichhold is naturally unwilling to divulge specific processing information. Detailed processing data for pilot plant scale expoxidations are, however, readily available in the literature[32], and field reports indicate that the conditions employed here match closely those employed in large scale production.

Separation of the resin from finished product, carried out using conventional filters and screens, ordinarily causes Reichhold no particular difficulties. However, where resin breakdown occurs, fragments can be removed only by the use of special equipment. Development of polar forces and subsequent swelling of the resin likewise occasionally causes difficulties in removal. Fortunately, both problems can be solved by avoiding excessive reuse of the resin. (Dowex 50W is a product of Dow Chemical Company, Midland, Michigan.)

Check 3805 opposite last page.

Editor's Note:

In addition to being employed as expoxidation catalysts, ion exchange resins have been utilized or suggested for a wide variety of other catalysis applications.

For example, the literature reports that cation exchangers have been used as catalysts to form acetals from benzaldehyde, n-butyl, n-hexyl, n-heptyl, and methallyl alcohols, and methyl acrolein.[1,2] Formals of several

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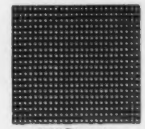

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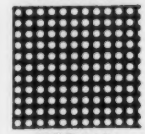

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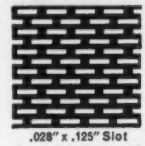

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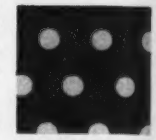

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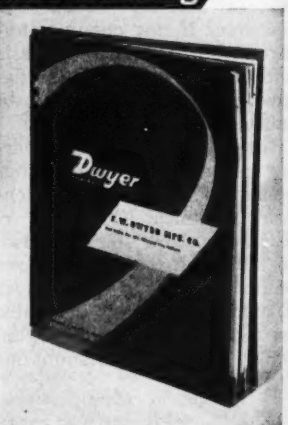

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alcohols have also been prepared, and trioxocanes and dioxolines have been formed.[3,4,5]

Alcohols catalytically dehydrated with ion exchange resins include tert-butyl alcohol[4], cyclohexanols[6,7], terpin hydrate[7], 1,2-, 1,3- and 1,4-cyclohexanediols[6], ethylene and diethylene glycols[8], benzyl alcohol and 2-phenyl ethanol[9].

Aldehydes condensed by resin catalysis include n-butanal, n-hexanal[10] and n-heptanal[11]. Furfural has been condensed with n-hexanol, n-heptanol and acetone[12], nitromethane with various aldehydes, and cyclohexanone with itself to yield 2-cyclohexylidene cyclohexanone[13].

A number of reactions involving sugars are resin catalyzed. These include inversion of sucrose,[14,15,16] reversible conversion of glucose to fructose[17], and mutarotation of glucose[18].

Compounds prepared by esterification catalysis using cation exchangers include n-butyl oleate, furfuryl acetate, triacetin, glycol diacetate, ethyl chloroacetate[4], ethyl cyanoacetate[7], dibutyl phthalate[19], and ethyl acetate[20]. Effectiveness of different types of resins and degrees of crosslinkage in ester hydrolysis has been investigated[21,22,23,24] and various esters have been hydrolyzed[25,26].

Protein compounds rapidly hydrolyzed by use of resin catalysts include gelatin and casein, while egg albumin, bovine serum albumin, and lactalbumin are hydrolyzed at a much slower rate[27,28].

Additional resin-catalyzed reactions of interest include the cyanoethylation of alcohols[29], conversion of nicotinonitrile to nicotinamide[30], condensation of benzaldehyde to benzoin, and polymerization of styrene[31].

New catalytic uses are almost certain to develop as the versatility of ion exchange resins becomes more widely recognized.

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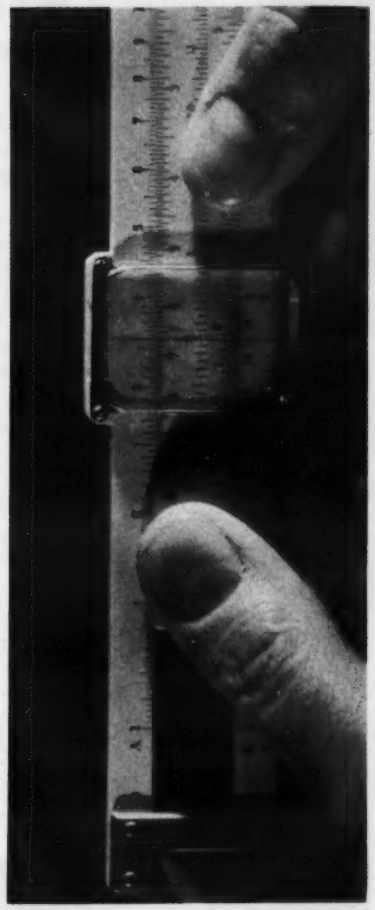

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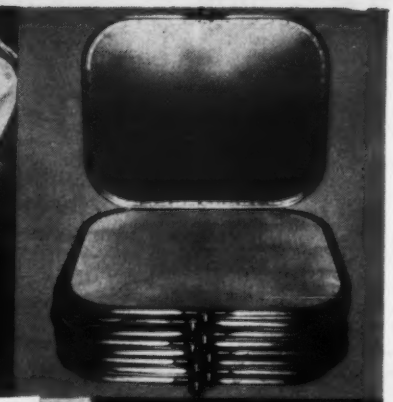

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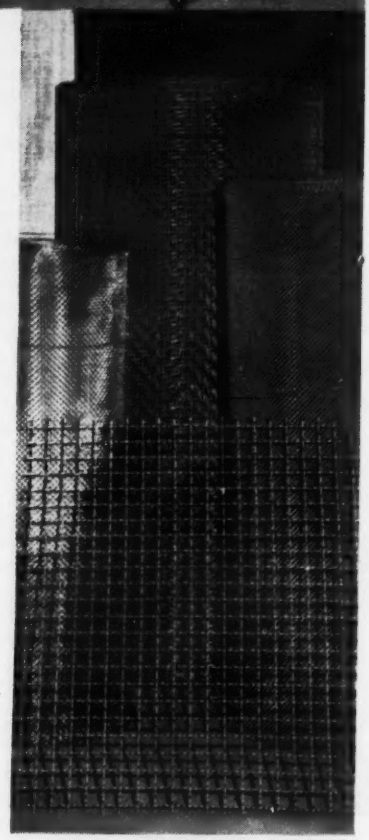

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Epoxidation process patent granted

Becco Chemical Div., Food Machinery and Chemical Corp., has been granted U. S. Patent No. 2,919,283 covering a process for in-situ epoxidation using ion-exchange resins as catalysts and hydrogen peroxide as oxidant. Patent covers both an expendable resin process and protected resin process which overcomes problem of resin being attacked by oxidizing medium.

(For more information on epoxidation process contact Becco Chemical Div., Food Machinery and Chemical Corp., Buffalo, New York.)

Check 3810 opp. last page.

THAT'S INTERESTING

Sputnik fever

"Sputnik fever" has prompted many potential engineers to study science instead of engineering, Dean Dale R. Coron, Cornell University College of Engineering, contends. Enrollments have dropped the past two years since advent of satellites.

In the bag

Use of large polyethylene bags by industry is expected to reach 100 million mark by 1962, according to R. A. Hickman, manager of market planning, Dobeckmun Co., division of Dow Chemical Company.

Cleanermat

Coin-operated dry cleaners will be appearing on the U.S. scene soon according to *Launder-Matic Age*. Machine cleans, extracts and drys four men's suits or 11 women's dresses in 32-minute cycle. Unit has two separate compartments, each metered and operated separately. Sealed filtering system minimizes loss of cleaning solution.

If the above advertisement could have been written by you—then look no further. Just get in touch with Oronite and talk over your phenol requirements.

Oronite has always been willing to invest to meet its customers' growing demands. Proof of this is the fact that Oronite's phenol plant capacity has been increased almost 50% since this plant began production just five years ago.

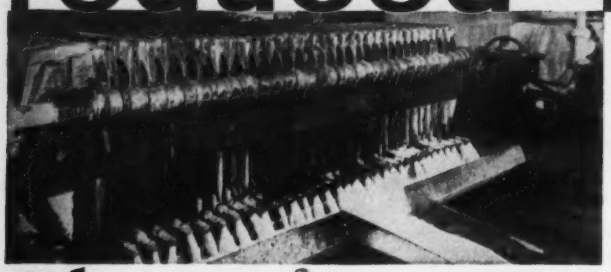
So if your process requires a highly pure phenol, or if you want to be assured of a most dependable source of supply — now and in the years ahead — just contact any Oronite office and discuss your needs.

ORONITE CHEMICAL COMPANY
A CALIFORNIA CHEMICAL COMPANY SUBSIDIARY

EXECUTIVE OFFICES • 200 Bush Street, San Francisco 20, California
SALES OFFICES • New York, Boston, Wilmington, Chicago, Cincinnati, Cleveland, Houston, Los Angeles, San Francisco, Seattle
Foreign Affiliate: California Chemical International, Inc., San Francisco, Geneva, Panama

Check 3811 opposite last page.

annual filter paper costs reduced 41%



at ANACONDA® with NETONE FILTER PAPER

- ***Netone has service life of 12 cycles (old paper lasted one cycle)***
- ***Easier to put on filter press, less installation damage***
- ***Shows excellent resistance to solution shock***

At The Anaconda Company, Electrolytic Zinc Plant, located at Anaconda, Montana, Netone filter paper has been used exclusively on the Shriver filter presses since January 1, 1955. Netone is a heavy, neoprene filled paper possessing remarkable wet strength characteristics.

Prior to the use of the Netone paper on the Shriver presses, it was necessary to discard the kraft paper sheets then in use each time a press was cleaned. The life of the Netone paper in the same service is an average of 12 press cycles. Due to its greater wet strength, the Netone paper is less apt to be damaged during installation and has greater resistance to rupture from solution shock when the press is put in service.

Annual filter paper costs have been reduced 41%. The savings in labor and filter down time are also considerable.

Why not try NETONE Filter Paper on your filter? Test samples on request, no obligation, of course.

Weavers of Industrial Filter Media for over Fifty Years

NATIONAL FILTER MEDIA *Corporation*

General Offices and Mills: New Haven 14, Conn.
Western Office and Factory: Salt Lake City 10, Utah
Sales Offices—Representatives
Atlanta, Georgia: 990 Lindridge Drive, N.E.
Cleveland 39, Ohio: P.O. Box 7
Alhambra, California: 20 South First Street
Chicago, Illinois: 6034 N. Cicero Avenue

Check 3812 opposite last page.

Diallyl phthalate resin permits laminates of natural wood

Surfaces resist abrasion and chemical attack

Uses: Laminating resin system is formulated for production of highly protective laminates. It forms a moisture-proof, heat-, abrasion-, and solvent-resistant surface.

Features: In addition to high abrasion resistance and chemical resistance of finished surface, laminating resin permits lower pressures and reduces material cost in preparing products. Reduced pressures required, permit use of natural-wood veneers. This has not previously been possible.

Description: To form decorative laminate, Daponite, a dry free flowing powder prepolymer (Dapon diallyl phthalate resin) is coated on paper from an acetone solution. Coated paper, natural wood veneer or printed paper, and plywood, cardboard, chipboard, or other flat smooth-surface core are combined to form final panel. As with melamine, phenolic and other commonly used finishes, a balance surface is applied on reverse side to prevent warping.

Finish formed with diallyl phthalate laminating resin demonstrates superior abrasion resistance (left)

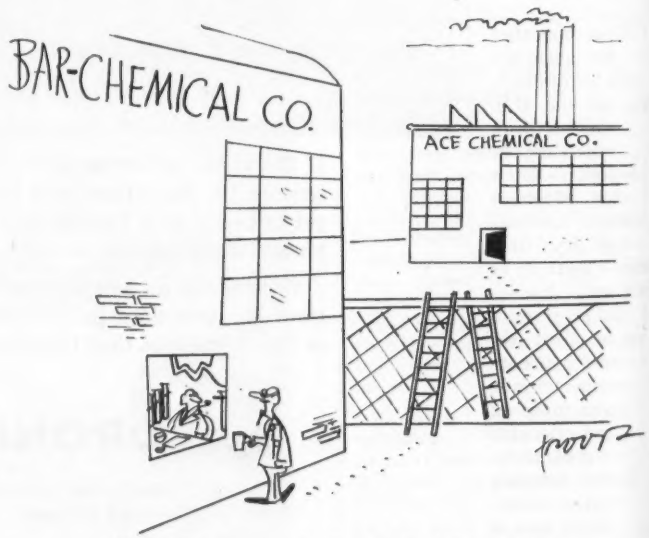
Tests indicate that laminates prepared from this material can be produced at roughly 63% of cost/sq ft compared to conventional laminating systems now used for comparable products. Pressures required range from 100 to 250 psi. This is considerably less than pressures required with melamine laminates which can range as high as 1,000 psi.

(Dapon diallyl phthalate resin is a product of Chemicals and Plastics Division of Food Machinery and Chemical Corporation, 161 East 42nd Street, New York 17, N. Y.)

Check 3813 opposite last page.

(Daponite laminating paper can be obtained from U. S. Polymeric Chemicals, Inc., Stamford, Conn.)

Check 3814 opposite last page.



"May I borrow a flask of tributylamine?"

More stable paints aim of emulsifier for latexes

Product aids dispersing without foam

Uses: Product is designed as a pigment dispersing agent and emulsifier for latex emulsion paints.

Features: Because product is dispersable and not soluble in water, larger concentrations can be used with no adverse effects on water sensitivity of latex film. It affords greater color development and provides a stable, homogeneous formulation.

Description: Light amber non-ionic surface active agent is liquid at room temperature. It is non-foaming.

Tests indicate that 0.5 to 1.0% emulsifier, based on weight of pigment, is effective in promoting and facilitating thorough wetting in dispersion of pigments. It is soluble in all proportions in aromatic hydrocarbons, vegetable oils, and alcohol.

(Monamulse LTP surface active agent is the product of Mona Industries, Inc., Chemical Div., Paterson 17, N.J.)

Check 3815 opposite last page.

Impregnating varnish cures at 150°C is stable

Silicone formulation has long shelf life

Uses: Material can be used as electrical insulation or to protect and improve organic insulation system.

Features: Impregnating varnish develops outstanding electrical properties at 150°C. It eliminates need for high-temperature curing ovens and permits use of existing organic varnish curing facilities. Due to formulation and catalyst system, product is reported to exhibit excellent shelf life and tank stability.

Description: Low-temperature-curing silicone impregnating varnish (SR-220) has higher initial dielectric strength than conventional impregnating varnishes. High value remains relatively constant even after extended heat aging. A typical value is over 2000 volts/mil after 39 days at 250°C.

(Silicone varnish-SR220 is a product of Silicone Products Department, General Electric Co., Waterford, N. Y.)

Check 3816 opposite last page.

Specific adhesion to films of cellulose, synthetics typifies copolymer

Pressure-sensitive adhesives potential end use

Uses: Solution should have utility for laminating, or formulation of pressure-sensitive adhesives.

Features: Versatile copolymer is tacky and shows specific adhesion to most cellulosic and synthetic films such as cellulose acetate, Mylar polyester film, vinyl and foil.

Description: Product is a vinyl acrylic copolymer solution. It can be thinned easily with inexpensive solvents and is compatible with a variety of modifying resins. Heat and light stability are reported to be excellent.

(Resyn 26-2404 is the product of National Starch and Chemical Corporation, 750 Third Avenue, New York 17, N.Y.)

Check 3817 opposite last page.

Solids content of 35% in electronic grade potassium silicate

Electronic potassium silicate contains 35% solids, reported as the highest commerically available. Known as PS-7, product is expected to enable users to achieve substantial savings on transportation, handling and storage costs.

(PS-7 Potassium Silicate is a product of Sylvania Electric Products, Inc., Subs. of General Telephone and Electronics Corp., 730 Third Avenue, New York 17, N.Y.)

Check 3818 opposite last page.

exclusive direct unloading system cuts CO_2 handling costs

To be sure you get rock bottom CO_2 costs, investigate this exclusive method of handling CO_2 shipments. It's Olin Mathieson's patented Direct Unloading System in which CO_2 flows directly from special insulated tank cars to your process.

This new system bypasses intermediate steps such as storage in refrigerated tanks, handling of cylinders, or converting dry ice, along with the expensive facilities that are required. Maintenance and upkeep are reduced, valuable plant space or land is reclaimed, and a constant supply of CO_2 is available to match every demand.

If your process requires a highly dependable, low cost source of CO_2 supply, talk over your requirements with an Olin Mathieson representative soon. 7333

Olin Mathieson
Chemicals Division • Baltimore 3, Md.

CHEMICALS

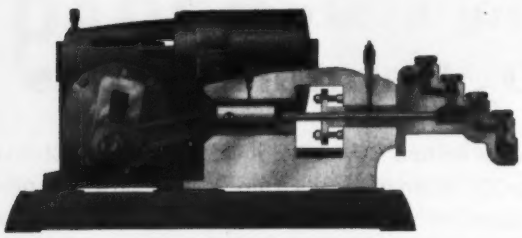
Check 3819 opposite last page.

HOW TO METER SLURRIES ACCURATELY

Few pumping jobs present more complex problems than the accurate metering of slurries. Since they are often abrasive, slurries can make the selection of pump parts extremely difficult. Minute particles settling out in the packing can score a plunger beyond usefulness in minutes. And viscous, tacky slurries can limit ball check freedom and reduce accuracy. But even the toughest slurries *can* be metered accurately . . . by adhering to good slurry handling practice, and by choosing the right pump for the job.

Keep Slurries In Suspension

Several practices that have proved valuable in this difficult service are aimed at keeping the solids in suspension. Suction and discharge lines should be as short as possible. The supply tank should always be well agitated. And if packed plunger pumps are used, stroking speed should be held between 45 and 75 rpm to minimize settling.



Standard Motor Driven Controlled Volume Pump

Choosing The Right Pump

Controlled volume pumps are manufactured in a sufficient variety of designs to provide a full range of desired characteristics for slurry service. An economy pump such as Milton Roy's H20® can handle slurries up to 5% by weight. Standard motor driven pumps, with minor modification, can handle much denser slurries. And the new ODS (Oliver Diaphragm Slurry*) controlled volume pump can easily manage slurries containing up to 60% solids by weight.

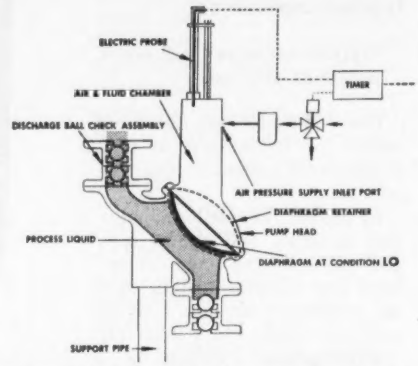
*Manufactured under exclusive license granted by Dorr-Oliver Inc.

Packed Plunger Pumps

Because the entire liquid end of a packed plunger pump is in intimate contact with the slurry, considerable attention must be paid to materials selection. Ball checks and plunger should be as hard as possible, and seats should be relatively soft. Balls are usually made of Hastelloy D, 440 stainless, or ceramic, while 316 stainless is standard for the seats. The plunger must be extremely hard, and high strength sintered alumina is generally recommended.

Proper packing maintenance in slurry service demands that packing be flushed out continuously. An internal flush, continuously bleeding a small amount of liquid along the plunger, is the most common. Dangerous liquids may require an external flush arrangement. Liquid is continuously fed in on one side of the lantern ring, drawn around the plunger, and carried away from the other side.

The ODS Controlled Volume Pump



Capable of pumping 180 gph of the densest slurries at accuracies of ± 2% against pressures up to 90 psi, the ODS has no plunger, no packing. It is based on the Oliver Diaphragm Slurry pump design principle which consists of two opposed chambers separated by a slack diaphragm. A three-way solenoid alternately pressurizes and bleeds air from the upper chamber. With the upper chamber at atmospheric pressure, the suction head forces slurry into the lower chamber. Then, when the upper chamber is pressurized, the diaphragm forces the slurry out through the specially designed ball check valves.

Problem Slurries

Yes, slurries *can* be metered accurately. And the best proof of this claim is the thousand or more Milton Roy pumps successfully metering slurries in the field. The list includes such problem liquids as an 80% coal slurry, a 45% suspension of lead peroxide in butyl phthalate, 15 to 20% diatomaceous earth slurries, finely divided nickel catalytic suspensions, gold ore slurries, and even a 55% by weight powdered aluminum suspension. Some of these materials are so thick that they can support the weight of a screwdriver.

If precision metering of slurries is one of your problems, look again to Milton Roy's 25 years of experience for your most economical solutions. Write for a general introduction to controlled volume pumping given in Catalog 553-1, Milton Roy Company, 1300 East Mermaid Lane, Phila. 18, Pa.

milton Roy
CHEMICAL INSTRUMENTATION SYSTEMS

Controlled Volume Pumps • Quantichem Analyzers • Chemical Feed Systems

Check 3820 opposite last page.

CHEMICAL MATERIALS

Bondable fluorocarbon made by using this etching solution

Carbonaceous surface film formed on polymer

Uses: Making fluorocarbon polymers bondable to other materials.

Features: Prepared etching solution simplifies and speeds job of making fluorocarbon polymers easily bondable to other materials by conventional methods.

Description: Fluoroetch solution is an activated form of sodium in solution. It reacts with fluorocarbon resin, extracting chlorine atoms at surface with formation of a carbonaceous film compatible with most adhesives. Solution can be applied by dipping, spraying, brushing or spotting, and takes from two to fifteen seconds. Material is highly flammable and can be stored in polyethylene, steel, stainless steel, monel or nickel.

(Acton fluoroetch solution is product of Acton Laboratories, 1180 Raymond Boulevard, Newark 2, N.J.)

Check 3821 opposite last page.

From the Test Tube

From page 31

and earliest users of isophthalic acid, Chemical Process Co., Redwood City, Calif. Here's what H. H. Pomeroy, manager of plastics division, says:

"As I see it, conventional phthalic anhydride/maleic polyesters will be almost entirely supplanted by isophthalic/maleic polyesters within the next two to five years."

"Isophthalic acid polyesters have better physical properties than other polyesters when molded in matched metal dies," according to Robert S. Morrison, president, Molded Fiber Glass Body Company, Ashtabula, Ohio.

"In auto bodies and boat hulls, maximum strength, rigidity, and impact resistance need to be combined. We ob-

tain the highest combination of these properties with isophthalic acid, and we further eliminate practically all crazing at resin rich areas, even after high temp baking."

(Isophthalic acid is a product of Oronite Chemical Co., a subsidiary of Standard Oil Co. of California, 200 Bush St., San Francisco 20, Cal.)

Check 3822 opposite last page.

Price drop of 30% boosts potential of succinic

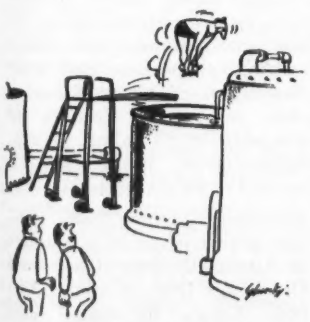
Uses: Used largely in manufacture of colorants and pharmaceuticals, succinic anhydride is potentially important in preparation of polyester resins; polyester-based flexible polyurethane foams; plasticizers; and alkyd resins.

Features: A $0.23/lb price reduction to $0.51/lb is designed specifically to stimulate further experimentation with, and development of, new applications for succinic anhydride.

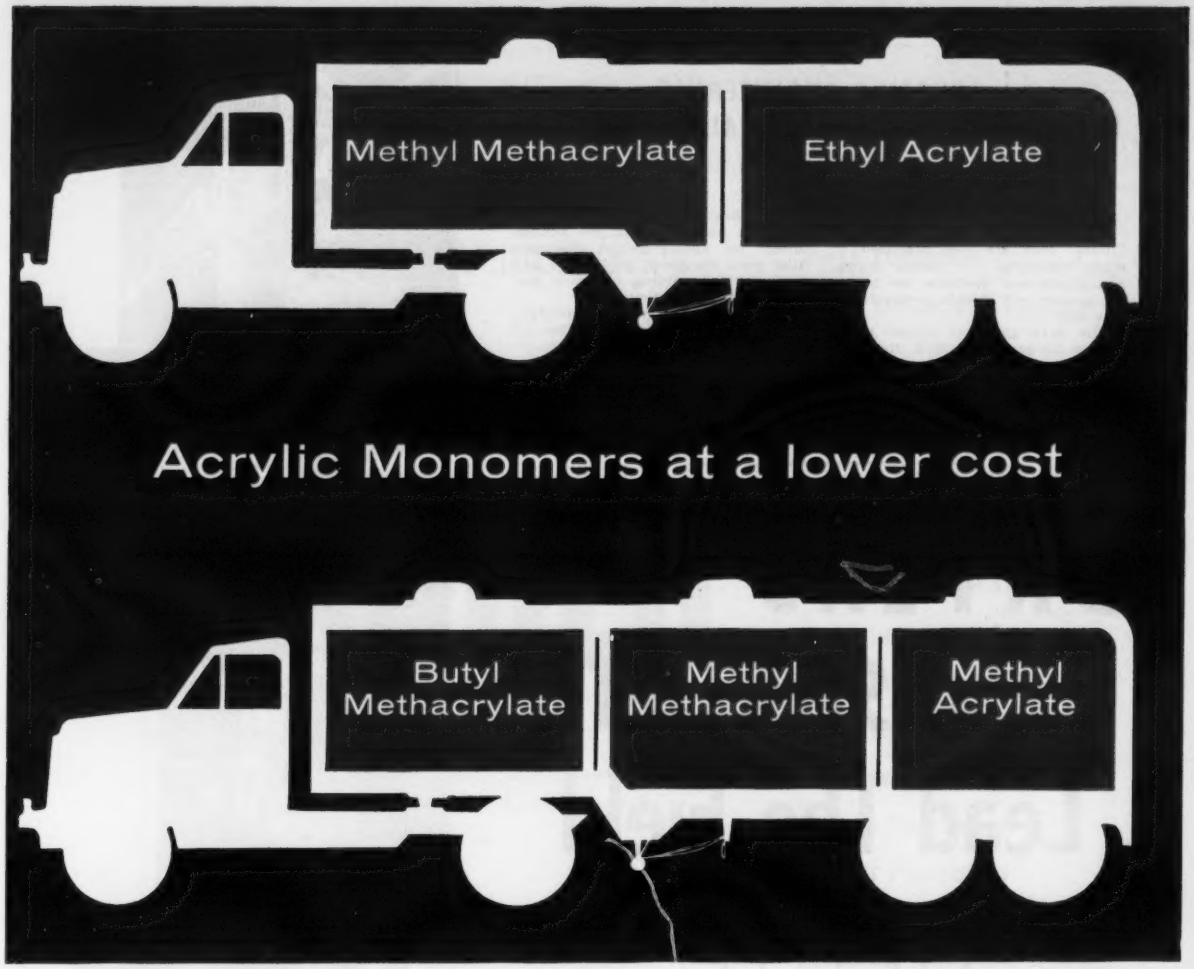
Description: Compound, a saturated dibasic acid, is a light-colored, powder-like material composed of needles or flakes. It is currently manufactured in pilot plant quantities with modest amounts available for experimentation.

(Succinic anhydride is a product of National Aniline Div., Allied Chemical Corp., 60 Broadway, New York 6, New York.)

Check 3823 opposite last page.



"He enjoys this tank inspection detail. . ."



The widest selection of acrylate and methacrylate monomers available from any one source plus delivery in compartmented tanktrucks can mean savings in money and time when you choose Rohm & Haas as your acrylic monomer supplier. This means that two or three monomers can be shipped at the same time, and as long as a tanktruck is filled, you pay the bulk price for each monomer. Savings such as this also apply to mixed truckloads and carloads of monomers in drums. And when you order from one source, you simplify your paper work and save time by writing one order instead of several.

Request information today on the convenience and savings made possible by buying acrylic monomers from the broad range offered by Rohm & Haas.

Write to Dept. SP-6 for samples, and technical literature relating to your processes.

Chemicals for Industry

ROHM & HAAS COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Acrylic Monomers available commercially from Rohm & Haas . . .

METHYL ACRYLATE • ETHYL ACRYLATE • BUTYL ACRYLATE • 2-ETHYLHEXYL ACRYLATE • METHYL METHACRYLATE • ETHYL METHACRYLATE • BUTYL METHACRYLATE • HEXYL METHACRYLATE • DECYL-OCTYL METHACRYLATE • LAURYL METHACRYLATE • STEARYL METHACRYLATE • GLACIAL ACRYLIC ACID • GLACIAL METHACRYLIC ACID

Check 3824 opposite last page.

CREATIVE ENGINEERING TRANSLATED INTO PRACTICAL PRODUCTION

SARGENT imaginative engineering has created numerous "firsts" that are now standard in many industries . . . better drying equipment and methods for better production and better products at less cost.

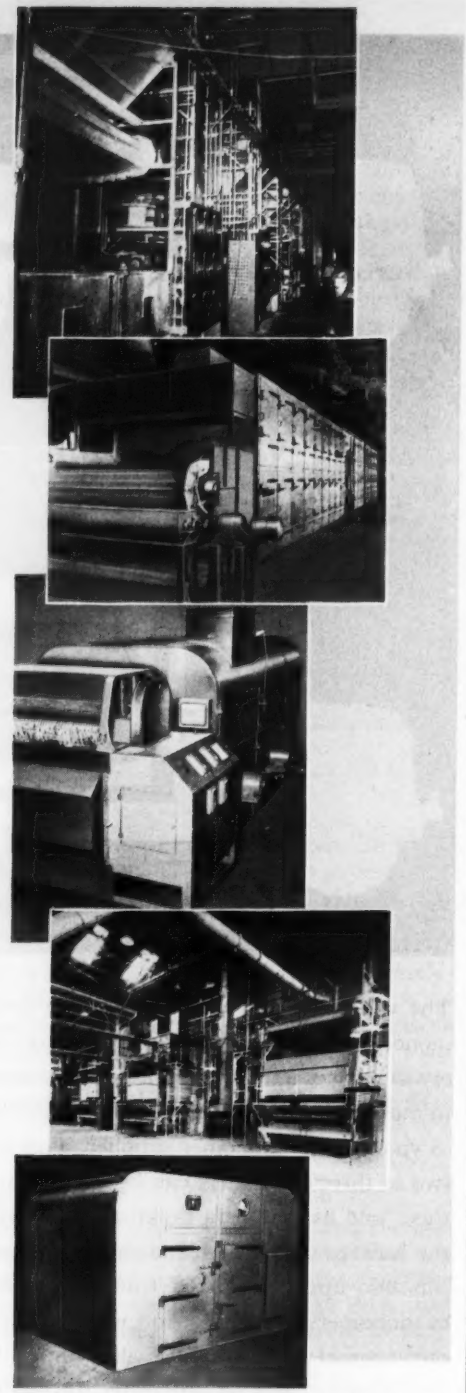
The first gas-fired rubber dryer was a Sargent. The first flashless powder was dried in a Sargent. The first gas-fired conveyor dryers for tobacco, for grain, for wool stock, all were Sargents. New man-made textile fibres and innumerable other products have come to the market dried by special-design Sargents that were designed, engineered and built to the exacting needs of product and of production.

From small lab and table models, from tray and truck dryers, through huge capacity, multi section, multi-stage conveyor dryers and rotary dryers, a Sargent is engineered to serve profitably and well for many years to come.

DRYERS by SARGENT Lead The Field

- in operating economy
- proven high-level production
- minimum of maintenance requirements
- easiest, quickest cleanout
- dependability of guaranteed performance
- fastest installation, with erection costs the lowest on the market

Let us give you details.



Sargent installations pictured above: Bank of 4 synthetic rubber dryers, 3-pass, gas-fired, at Goodyear Tire and Rubber Company, Houston, Texas • Two-stage Kaolin dryer with Sargent double-hopper extruder, at American Industrial Clays, Sandersville, Ga. • Pilot plant dryer with extruder and cooling sections. Remarkably compact and efficient. At a well-known chemical company • Four Sargent dryers for England's first general purpose (bulk) synthetic rubber plant. Built under Sargent license — installed at International Synthetic Rubber Co., Ltd., Hythe, Southampton • Two-compartment truck dryer with controlled even heat distribution through all trucks, at a large chemical company.

DRYERS (Conveyor, Tray, Truck, Rotary, Pole, Tunnel, Laboratory, Pilot Plant)
COOLERS • FEEDERS • EXTRUDERS • GRANULATORS

C. G. SARGENT'S SONS CORPORATION
Graniteville, SINCE 1852 Massachusetts

PHILADELPHIA • CINCINNATI • ATLANTA • CHARLOTTE • HOUSTON • CHICAGO • DETROIT • TORONTO

Check 3825 opposite last page.

CHEMICAL MATERIALS

Announces availability of 12 intermediates for research

Manufacturer has announced the availability of a group of research intermediates.

They are:

- N,N'-diethyl-2-butyne-1,4-diamine
- 1,7-diethyl-4-methyl diethylenetriamine
- 3,4-dimethylbenzylamine
- 6,10-dimethyl-2,6,10,14-tetraazopentadecane
- N-ethyl-N'-methyl ethylenediamine
- 3,3'-bis(methylamino)-N-methyl dipropylamine
- N-methyl-o-chlorobenzylamine
- 4-methyl 1,1,7,7-tetraethyl diethylenetriamine
- N,N,N',N'-tetraethyl-2-butyne-1,4-diamine
- 1,1,7,7-tetraethyl diethylenetriamine
- N,N,N',N'-tetramethyl-2-butyne-1,4-diamine

(Research intermediates are available from The Ames Laboratories, Inc., 132 Water St., South Norwalk, Conn.)

Check 3826 opposite last page.

Surface-active agent developed for dry alkaline products

Uses: Material is designed for use in formulating bottle washing, metal cleaning, and detergent products.

Features: Surface-active agent was developed specifically for use with a dry alkaline material such as flake caustic or sodium metasilicate. It is stable and does not discolor when stored in flake caustic compositions for prolonged periods at up to 50°C.

Description: Agent is formulated from alkyl phenyl polyethylene glycol ether. It has low-foaming and good wetting properties and aids dissolution of alkaline materials in water. Product is available in 55-gallon drums. Light-yellow liquid has a sp gr (20/20°C) of 1.031.

(Tergitol Nonionic E-35 surface active agent is a product of Union Carbide Chemicals Company Div., Union Carbide Corp., 30 East 42nd Street, New York 17, N.Y.)

Check 3827 opposite last page.

NEW LITERATURE

Chemical Materials

Physical properties booklet of 28 pages describes more than 400 synthetic organic chemicals. It contains information on applications and shipping data and includes a section on new chemicals for evaluation and chemicals for special applications. "Physical Properties Booklet" — Union Carbide Chemicals Company Div., Union Carbide Corporation.

Check 3828 opposite last page.

Diphenolic acid, its derivatives, and applications are discussed in series of technical data sheets. Synthetic resins, polyether acids, alkyd formulations, and water solution coating systems are discussed. Bul 2—5 "Diphenolic Acid"—S. C. Johnson & Son, Inc.

Check 3829 opposite last page.

Chemical listing, predominantly pyridine and pyridine derivatives, consists of eight pages. Products are listed alphabetically and according to class with condensed physical property data. "Chemical Index Fifth Edition"—Reilly Tar and Chemical Corporation.

Check 3830 opposite last page.

Hardening of epoxy resins study treats kinetics of epoxy polymerization. Study was made utilizing nuclear magnetic resonance analyzer. Report 33.58—Ridgefield Instrumentation Division, Schlumberger Well Surveying Corp.

Check 3831 opposite last page.

Nitrogen hetrocyclics, organic arsenicals and methylated compounds are included in pocket-sized folder of development and commercial materials available. "Chemicals For '60"—Ansul Chemical Company.

Check 3832 opposite last page.

Aliphatic amines are detailed in technical bulletin which gives physical and chemical properties, potential applications and price information. Bul D 4012-A—Industrial and Biochemicals Department, E. I. du Pont de Nemours and Company.

Check 3833 opposite last page.

Tall oil bibliography discusses preparation, properties, reactions and applications of product and its derivatives. Covering subjects from abietic acid to zinc treatment, bulletin presents over 1600 articles, reviews and patents. Totalling 450 pages, "Tall Oil Bibliography" is available on company letterhead request from Pulp Chemicals Association, 60 East 42nd Street, New York 17, N.Y.

The 20th Century Genie

HARSHAW FLUORIDES

Harshaw first started to manufacture hydrofluoric acid in 1904. Today, Harshaw's Fluoride Division produces 26 different fluoride chemicals for as many industries.

In addition to

BORON TRIFLUORIDE

HYDROFLUORIC ACID—Aqueous-Anhydrous

there is a long list of other fluoride chemicals. If necessary, you are invited to draw on the experience of our staff of technical specialists.

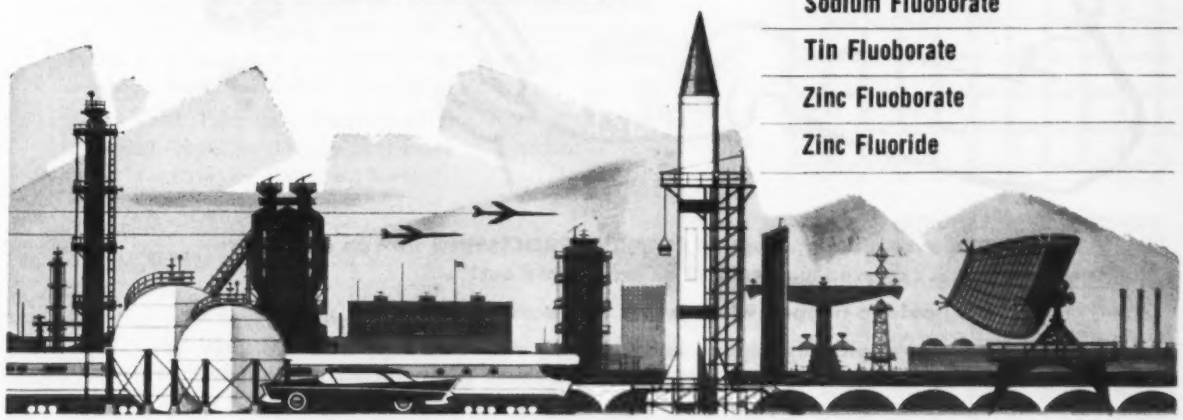
THE HARSHAW CHEMICAL CO.

1945 East 97th Street • Cleveland 6, Ohio

Chicago • Cincinnati • Cleveland • Detroit • Hastings-On-Hudson
Houston • Los Angeles • Philadelphia • Pittsburgh

HARSHAW ALSO SUPPLIES:

- Ammonium Bifluoride
- Ammonium Fluoborate
- Barium Fluoride
- Bismuth Fluoride
- Boron Trifluoride
- Boron Trifluoride Complexes
- Chromium Fluoride
- Copper Fluoborate
- Fluoboric Acid
- Fluorinating Agents
- Frosting Mixtures
- Hydrofluoric Acid Anhydrous
- Hydrofluoric Acid Aqueous
- Hydrofluosilicic Acid
- Laboratory Fluorine Cells
- Lead Fluoborate
- Lithium Fluoride
- Metallic Fluoborates
- Potassium Bifluoride
- Potassium Chromium Fluoride
- Potassium Fluoborate
- Potassium Fluoride
- Potassium Titanium Fluoride
- Silico Fluorides
- Silicon Tetrafluoride
- Sodium Fluoborate
- Tin Fluoborate
- Zinc Fluoborate
- Zinc Fluoride



Check 3834 opposite last page.

EXECUTIVE REPORT #6

FILTER FABRICS THAT DEFY THE ELEMENTS

No problem is too tough for Wheelabrator® Dustube® Collectors

High temperatures, corrosive or abrasive contaminants in the collected gases pose no insurmountable problems for Wheelabrator Dustube Collectors. These efficient cloth bag type collectors are made exceptionally versatile by use of synthetic filtering fabrics of treated glass, Nylon, Orlon, Dacron, etc., which afford long service life and optimum resistance to acids, alkalis or abrasive materials encountered in any specific application. For example, with Wheelabrator Glastube® collectors employing glass filter fabric tubes, temperatures up to 550° F. can be accommodated.

Dustube Collectors offer high efficiency and low cost for equipment and operation

Collection efficiencies uniformly above 99% by weight and 95% by discoloration test are regularly achieved by Dustube systems in a wide range of applications. For engineering information write to Wheelabrator Corp., 478 S. Byrkit St., Mishawaka, Ind. In Canada, P. O. Box 490, Scarborough, Ontario.

Check 3835 opposite last page.

WHO SWIPED PAGE 43 ?

D'ja ever pick up a copy of CHEMICAL PROCESSING with an article torn out . . . or even worse, HALF an article torn out?

It's liable to happen when copies are routed around your plant.

You can avoid this annoyance by getting your own copy of CHEMICAL PROCESSING each month. It's easy and there is no charge. Just fill in the subscription request form opposite the inside back cover.

CHEMICAL MATERIALS

Epoxy resin color concentrates data folder presents recommended applications, high-temperature tested results and color chips of available colors. Sizes and methods of packaging are also included with a price list. "Resinform Color Concentrates" — Resin Formulators, Inc.

Check 3836 opposite last page.

Nacreous pigments' use in coatings is detailed in four-page brochure covering choice of coating vehicles, techniques, and special color effects. "Coating with Nacreous Pigments"—The Mearl Corporation.

Check 3837 opposite last page.

Polystyrene molding compounds' resistance to impact is subject of 16-page booklet. Four specific compounds are discussed together with general information on impact polystyrenes. "The Test of Impact"—Union Carbide Plastics Company, Division of Union Carbide Corporation.

Check 3838 opposite last page.

Conditioners for hygroscopic salts and fertilizers are covered in 24-page brochure. Nine cationic chemicals and formulations used for conditioning are treated together with methods of application and recommended uses. "Armour Cationic Chemicals"—Armour Industrial Chemical Company.

Check 3839 opposite last page.

Hydrogen peroxide is treated in the 63-page brochure which presents properties on this compound, its water solution, and on handling, dilution and storage. Safety precautions are detailed at length. "Hydrogen Peroxide" — Solvay Process Division, Allied Chemical Corporation.

Check 3840 opposite last page.

Paint vehicle that is water reducible is comprehensively treated in 23-page technical service bulletin. Included are properties, analysis, manufacturing procedures and results of performance investigations. Numerous tables are used to present a concise picture of test data. Bul TS5991—Spencer Kellogg and Sons, Inc.

Check 3841 opposite last page.

Fatty acids from crude tall oil are described in basic technical booklet which discusses supply factors, properties, and tells how product may be used in protective coatings, plasticizers, detergents, and asphalt additives. "Pamak Fatty Acids"—Hercules Powder Company.

Check 3842 opposite last page.

Plastic wall tile and adhesives for its application are subject of revised standards recently issued. Appendix to CS 168-50 — Society of The Plastics Industry, Inc.

Check 3843 opposite last page.

Cryogenic fluids' physical property equivalents are presented in handy folding pocket-card form. Card gives boiling and melting points; critical temperatures and pressures; volume, mass, and thermal equivalents; and conversion factors. Form 1341—Linde Company Division Union Carbide Corporation.

Check 3844 opposite last page.

Epoxy oils' use in protective coatings is subject of four-page application newsletter. Information included covers nature of expoxidized oil, basic reactions, applications and literature references. Bul 51—The Baker Castor Oil Co.

Check 3845 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Trichlorethylene's uses, particularly for vapor degreasing, are illustrated in 36-page booklet. Included are detailed descriptions and drawings for unloading, storage, and safety measures and material and equipment specifications. Bul 44A — Hooker Chemical Corporation.

Check 3846 opposite last page.

Organic intermediates used for production of color and for other applications are listed in 18-page brochure. List includes 339 compounds, derivatives of beta hydroxy naphthoic acid. Chemicals are available on commercial scale—or in research or pilot plant quantities. "Organic Intermediate Chemicals" — Pfister Chemical Works.

Check 3847 opposite last page.

Fluorescent pigments as colorants for polyesters, polyvinylchloride, and polyethylene are explored in series of three technical bulletins. Bul 1148, 1149 and 1150 — Switzer Brothers, Inc.

Check 3848 opposite last page.

Thioacetamide as an analytical reagent is subject of technical booklet that discusses use of product to precipitate metal sulfides and mechanisms of reaction. Cat 306 — Arapahoe Chemicals, Inc.

Check 3849 opposite last page.

These TYLER screens float— so you save structural costs

This battery of Tyler vibrating screens, in a plant of the latest design, is handling copper ore at a high production rate, and does its work without transmitting vibration to the base frame of the screen.

The vibrating screen body—as well as the drive shaft—floats on special rubber mounts. And moving parts are designed to be in dynamic balance at all times. With all the machine's energy being used to separate the materials, there's no need for secondary building structures and supports. Many Ty-Rock screens rest in operating position by their own weight without any bolted attachments.

Ask your Tyler representative to give you full information—and recommend equipment perfectly matched to your needs. That's Tyler Screening Service.

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Check 3850 opposite last page.

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And you'll save time, trouble and expense if you use an ODRENE. ODRENES are a series of fragrances scientifically compounded to solve the odor problems of household products. They are easy and economical to use—and available in a wide range of consumer-tested odor types. Each type is extremely versatile—readily adaptable to the special requirements of the product in which it is to be used.

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Check 3852 opposite last page.

A $19-million expenditure and 15 years of research reach fulfillment as . . .

Moldable Teflon Smashes Application Barriers

Uses: This form of fluorocarbon resin can be molded or extruded into variety of products. Possible applications include jackets for coxial cable and multi-conductor cable, aircraft wiring, molded electronic components, laboratory tubing and chemical equipment linings. Formation of extruded films is possible to permit lining of storage vessels or processing equipment.

Features: Material, Teflon 100, is a true fluorocarbon polymer with all exceptional properties of resistance to chemical attack and heat degradation, high mechanical strength, excellent electrical insulation, low friction and absence of moisture absorption. In addition, it can be melt processed in conventional extrusion and molding equipment. It will no longer be necessary to confine applications to those areas where parts could be fabricated by powder metallurgy techniques.

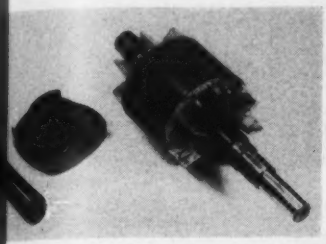
Another use formerly not practical is the coating of metal by fluidized solids process. Heated metal part is either sprayed with, or dipped into, fluidized bed of finely ground resin. A tough, pinhole-free coating is formed.

Description: Teflon 100 FEP is a copolymer of hexafluoropropylene and tetrafluoroethylene. It is fully fluorinated and differs structurally from earlier Teflons (TFE) in that copolymer chain is branched. Parts fabricated from FEP resin are capable of continuous service at temperatures up to 400°F. (This is roughly 100°F lower than TFE resins.) They will resist extreme cold, down to −450°F.

FEP fluorocarbon resin is

Pump impeller has been given a tough, chemically resistant coating of Teflon by fluidized solids technique

Almost any part that can be heated to proper temperature can be coated with Teflon regardless of size or shape



resistant to all known chemicals and solvents other than alkali metals under certain conditions, chlorine at elevated temperatures, and certain complex halogenated compounds such as chlorine trifluoride. Films of the resin exhibit no porosity and a low permeability to acids, bases, solvents and moisture vapor. Permeability to certain gases such as CO_2 is relatively high.

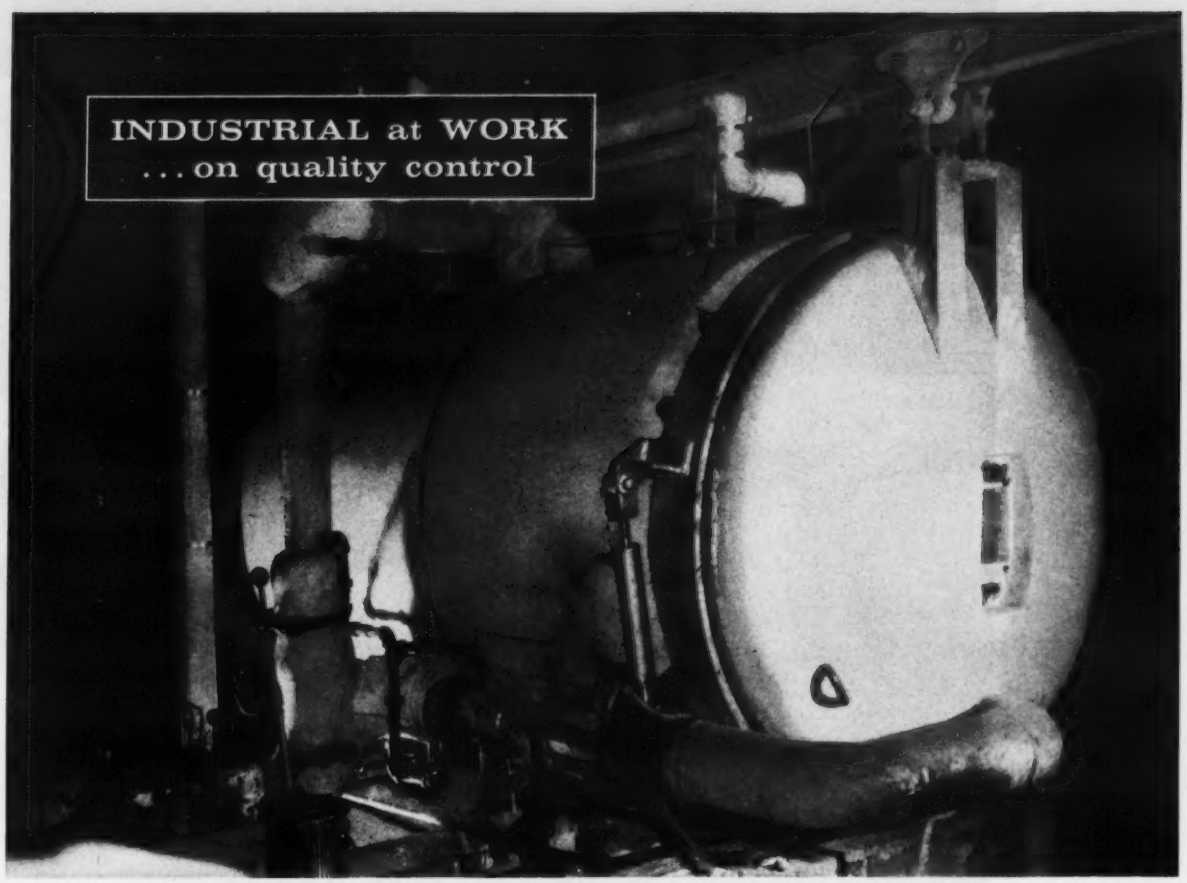
Molded parts retain mechanical toughness and strength over a wide range of temperature, from −450 to 440°F. Impact resistance at low temperatures is reported to be higher than any other known plastic. It is virtually unaffected by weather and remains unchanged when subjected to ultraviolet light, ozone, and extreme heat and cold.

Like TFE resins, dissipation factor and dielectric constant of FEP resin remain virtually constant over a wide range of temperature and over entire range of frequencies measured to date (60 cycles to 60 megacycles). Volume resistivity is greater than 2×10^{18} ohm-cm, even after prolonged water soaking. Resin will melt when exposed to an arc, but does not carbon track.

FEP resin is more transparent than TFE resins at equal thickness. It has good transparency up to 10 mils and very good transparency up to five mils.

Sold in natural color only at a price of $11.60/lb in truck-load quantities, it can be colored by dry blending with inorganic pigments.

To page 50



How STAUFFER CHEMICAL modernization pays off in improved sulphur quality

Improved sulphur quality and an increase in purification production were Stauffer Chemical's aims in a recent modernization program at their Chester, Pennsylvania operation.

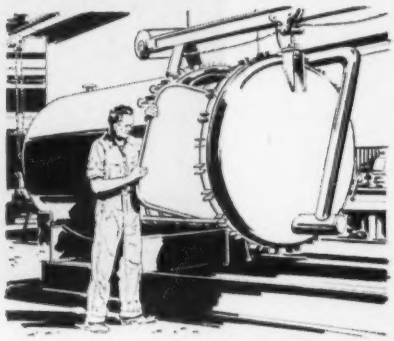
Playing an important role in these now realized goals was this type 122 *Industrial* horizontal filter. Here's how it helped Stauffer to:

IMPROVE QUALITY. Hand skimming of settled carbon from open troughs has been eliminated, permitting major improvements in quality control and optimum carbon removal through filter.

SPEED PURIFICATION. The Industrial filter is designed to handle both ash and carbon in one automatic operation. Raw sulphur is melted, purified and then pumped directly to processing.

In addition, the Industrial filter operation occupies *less* space because with settling eliminated—so is their need for tertiary tanks.

The Stauffer modernization story is typical of how quality-conscious processors throughout industry are turning to *Industrial*-engineered systems to help meet their customer requirements for more, but *better*, products . . . through controlled filtration.



Industrial's "lift out" leaves speed screen replacement and give easy access for filter maintenance. At Stauffer Chemical Company, extra-heavy bolted leaf construction and hydraulic leaf extractor automate operation.

WRITE FOR BULLETIN 122

INDUSTRIAL FILTER & PUMP MFG. CO.
5908 Ogden Avenue, Cicero 50, Illinois

INDUSTRIAL

C3B

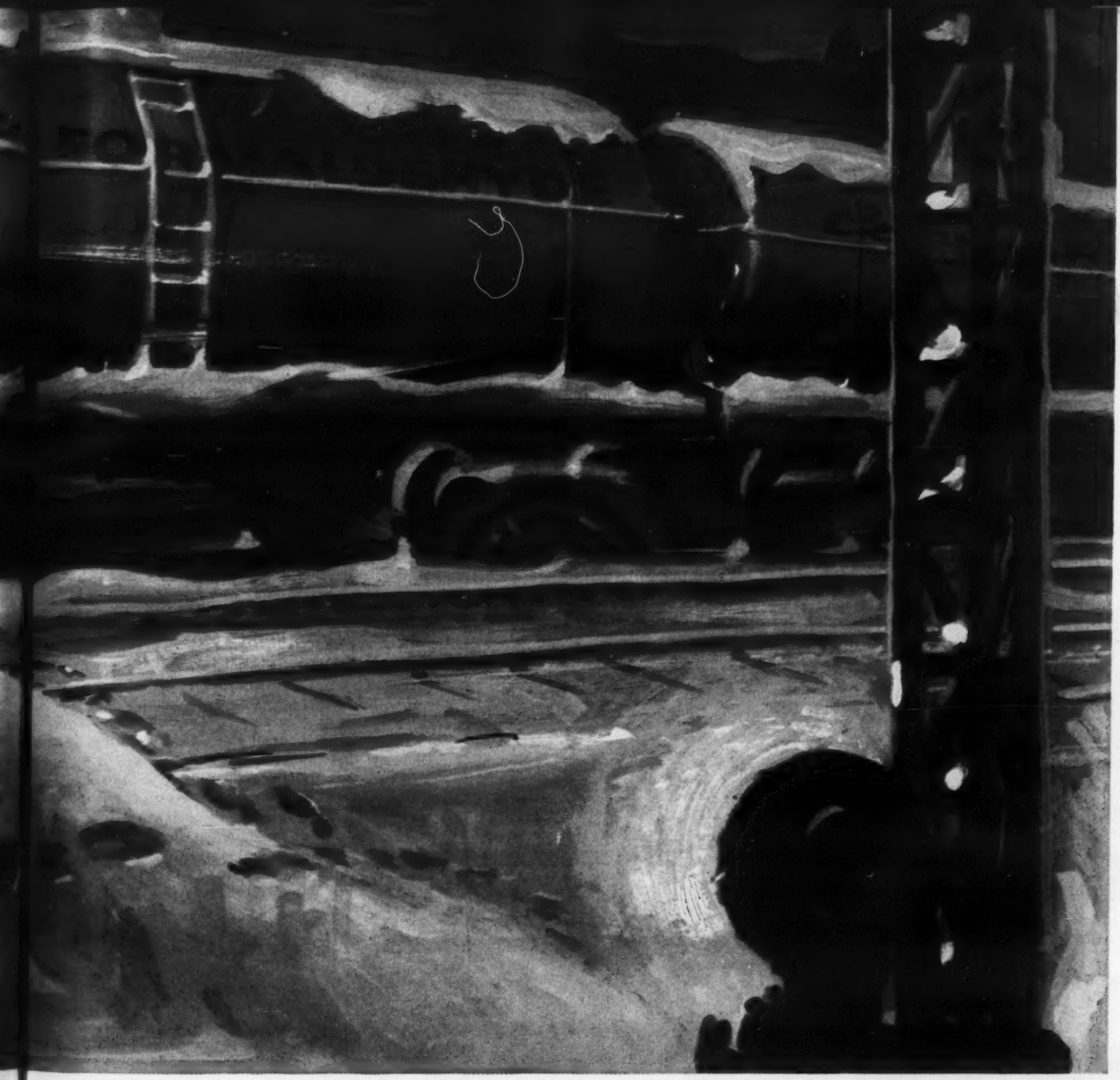
Check 3853 opposite last page.

now...industry's workhorse

When an industrial chemical as big as formaldehyde must be kept warm in transit and storage in order to prevent its deterioration, the costs for heated storage add up to a sizeable annual expense for industry.

Now a recent development of Celanese research promises substantial reduction in this expense for formaldehyde users. The new Celanese process "builds in" low temperature stability to permit safe storage at a full 15-20 degrees F. below previously recommended levels . . . makes possible higher formaldehyde concentrations with resultant economies in processing. Users will be interested in this stabilized formaldehyde. It has been thoroughly field tested, and it costs no more. Write us for corroborating data. Celanese Chemical Company, a Division of Celanese Corporation of America, Dept. 591-C, 180 Madison Avenue, New York 16, N. Y.

Celanese®



chemical beats the cold

Celanese
CHEMICALS

Canadian Affiliate: Canadian Chemical Company Limited, Montreal, Toronto, Vancouver
Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., New York 16

For more information on product at left, specify 3854 see information request blank opposite last page.

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Chempump is *the* canned pump proved in thousands of successful installations, ranging from heavy water to corrosive slurries. You can rely on Chempump to handle your costly, volatile, toxic, or other problem fluids safely, efficiently and economically. *Write now for composite bulletin 1100.*

Chempump Division, Fostoria Corporation, Buck and County Line Roads, Huntingdon Valley, Pennsylvania.

CHEMPUMP. *first in the field . . . process proved*

Check 3855 opposite last page.

CHEMICAL MATERIALS

Moldable Teflon

From page 47

Teflon 100 resin can be reinforced with up to 20% by weight of inorganic fillers and still remain melt processible. Glass fiber is one of best fillers found to date. It improves stiffness, wear resistance, and reduces thermal coefficient of expansion.

Material can be processed by screw extrusion, injection, compression and transfer and blow molding, vacuum forming, and coating by fluidized bed techniques.

(Teflon 100 is a product of Polychemicals Dept., E. I. du pont de Nemours & Co., Wilmington, Delaware.)

Check 3856 opposite last page.

Resin's long pot life gives it appeal for impregnating

Uses: Material was developed as an impregnating resin. It is rated as Class "B" electrical insulation material.

Features: Resin has a working pot life of two to four days for a five-gallon mass at 75°F.

Description: Semi-rigid epoxy resin system has a low mix viscosity of 4200 cps at 25°C. Mixing proportions are one to one for production use. ResinKast 709, has minimal shrinkage, little exothermic reaction and a cure schedule of 16 hours at 175°F or 8 hours at 200°F. Maximum use temperature is 350°F. Dielectric strength is 450 volts/mil.

(ResinKast 709 is product of Resin Formulators, Inc., 8956 National Boulevard, Los Angeles 35, California.)

Check 3857 opposite last page.

Laminated plastics and vulcanized fiber are treated in condensed catalog containing basic application information and engineering data. Eight-page, two-color presentation covers 21 grades of laminated plastics and six grades of vulcanized fiber in detail. "Laminated Plastics of Vulcanized Fibre"—Taylor Fibre Company.

Check 3858 opposite last page.

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8425 Ontario Street.....ELgin 2288

Achieves Controlled Particle Size Filtrations

Constant-density cartridge accurately removes particles greater than 75 microns

TED F. MEINHOLD, Associate Editor
with **B. R. ORWIG,** Supervisor, Dispersion Laboratory
and **ORVILLE WEBSTER,** Factory and Sales Coordinator, Lacquer Department
Sherwin-Williams Company, Chicago, Illinois

Problem: A filter media that would satisfactorily remove all particles larger than approximately 75 microns from a newly developed paint product was needed by Sherwin-Williams Company at their Chicago, Illinois plant. Full commercial production could not be undertaken until such a media was obtained.

The company hoped to use their existing cartridge-type filtering equipment for the operation. However, tests had shown that conventional cartridges just wouldn't work. A six-cartridge filter would plug up after only two or three gal of the thick, viscous paint passed through it. Numerous kinds of wool, hair, and other felt cartridges were tried. None produced the desired results.

The paint, now a standard commercial product, was specifically developed for use as a chalkboard finish. It has a synthetic resin base. Available in a variety of colors, the material provides an efficient, non-squeaky writing surface for chalk.

Solution: Filter felt evaluation tests were continued. Finally, a synthetic viscose fiber media was tried that looked encouraging. The manufacturer was contacted and asked to fabricate it into a cartridge. More tests were conducted. Working in close harmony with one another, the technical staffs of the two companies came up with a replaceable, constant-density cartridge that could successfully do the job.

Units were manufactured to fit standard 9¾ x 2½" and 10 x 2¾" filter cannisters. Final design consisted of a perforated, aluminum core supporting selected diameter viscose fiber discs. The discs are locked in place around the core by end retaining rings. Edges of discs are scalloped to give maximum filtering action. Cartridges are encased in stockinette for ease of handling.

Controlled particle size filtration is obtained by using fibers of uniform denier and quality. A 75-micron cartridge will hold back particles approximately 75 microns and over. It will let pass all particles up to about 74 microns. Cartridges to handle other micron size ranges (5 through 75) are now also available.

The device operates on edgewise filtration principle. Filtering action takes place through entire media bed — resulting in approximately 25% more filtering surface, longer service life, and lower pressure drop than conventional cartridges. Surface clogging is minimized since majority of sediment builds up in bed of cartridge fibers. Danger of batch contamination due to excessive pressure

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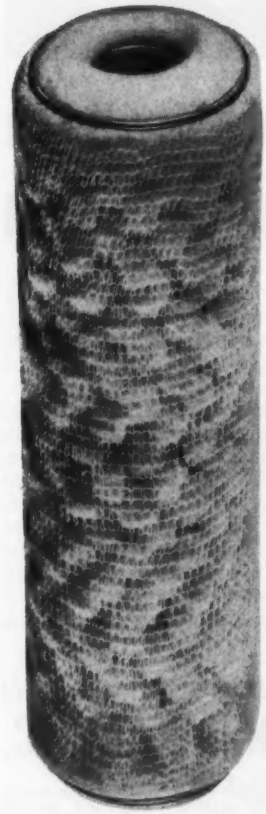


Cartridge consists of a perforated, aluminum core supporting viscose fiber discs

Cartridges are designed to fit easily into conventional cannister-type filters

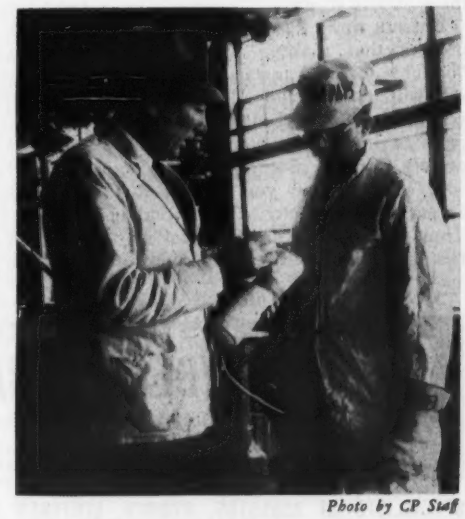
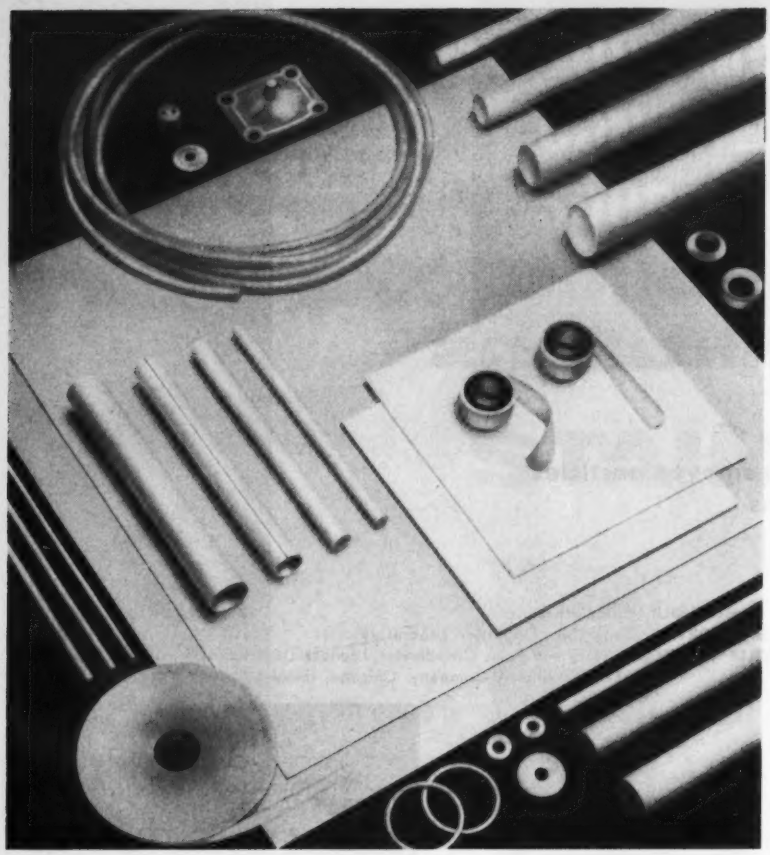


Photo by CP Staff

Orville Webster (left) explains construction of cartridge to filter operator, William Formosa



Now you can do even more with TEFLON – made bondable by R/M

Time was, you'd often rule out "Teflon"* where it was sorely needed, simply because you couldn't make anything adhere to it.

But not now. R/M has perfected a process that makes "Teflon" easily bondable to other materials and to itself with commercial adhesives. Now you needn't think of intricate "Teflon" parts as single costly pieces or as elaborately fastened assemblies.

R/M can supply you with "Teflon" sheets and tape etched for bonding. Thus you can use the chemical inertness and the superior electrical properties of "Teflon" without worrying about how to make it stay put. In fact, you can take advantage of bondability and non-bondability in the same R/M "Teflon" part.

A lot is happening in "Teflon" daily. To keep up with it, talk "Teflon" with the R/M man–learn of R/M's *complete "Teflon" service* that can help you cut process and maintenance costs without cutting corners. Call one of the offices listed below or write Plastic Products Division, Raybestos-Manhattan, Inc., Manheim, Pa.

*Du Pont trademark for its TFE-fluorocarbon resin

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RAYBESTOS-MANHATTAN, INC.
Manheim, Pa.

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SPECIALISTS IN ASBESTOS, RUBBER, SINTERED METAL, ENGINEERED PLASTICS

Check 3859 opposite last page.

buildups is also eliminated.

Results: The cartridge eliminated the filtration problem and production of the chalkboard finish went into high gear. A 300 gal batch at room temperature can easily be filtered through a six-cartridge unit in approximately two hours. Filter pressure is low — ranging from 5 to 10 psi. Particle size control is good.

Larger batches require somewhat higher pressures. For example, a 500 gal run takes about four hours to filter with pressure reaching 25 psi. Product holdup averages approximately one gal per set of six tubes. Sediment holding capacity is estimated to be two to three times greater than conventional cartridges, according to Sherwin-Williams.

Although initial price of the units is higher than for conventional cartridges, cost per 100 gal of filtered material is less — especially when filtering difficult products.

(Further information about Feutron filter cartridges may be obtained from American Felt Company, 312 Glenville Road, Glenville, Connecticut.)

Check 3860 opposite last page.

Acidic pickling waste handled in large volumes by PVC pipe

Plant disposes of 30,000 gallons per week

Problem: An efficient method of conveying acidic galvanizing process pickling waste from 15,000 gal storage vat to tank trucks was sought by A. M. Byers Company, at their Pittsburgh, Pa. plant.

The project was part of company's contribution to the Greater Pittsburgh's river cleanup program. Instead of dumping the 3-8 percent sulfuric acid content wastes into the Monongahela River, the pickling waste would be hauled to inland disposal sites.

Solution: Because of the corrosive nature of the waste,

Some Reasons Why

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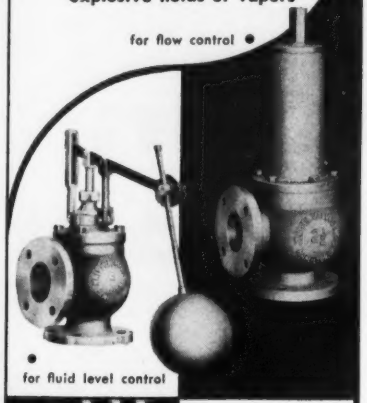

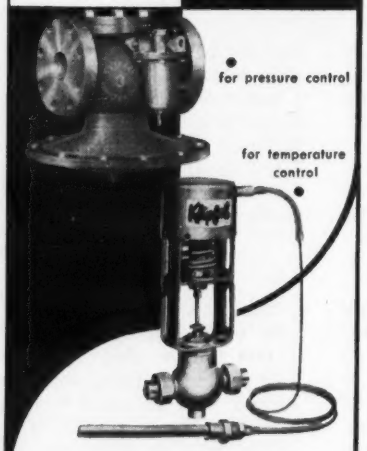

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Check 3862 opposite last page.

Pump (left) transfers waste pickling solution from sump through plastic line to 15,000 gal storage vat located beneath floor in foreground

engineers selected PVC pipe. More than 200 ft of 1½" diam Schedule 80 pipe was installed to transfer the material 150 ft from storage vat to truck loading area.

In the installation, one PVC pipe run pumps pickling solution from sump to storage vat located beneath the floor. A second pump and line conveys the waste in storage vat to truck loading area.

Results: The PVC pipe is successfully handling approximately 30,000 gal of pickling waste each week. Operating temperature of the line varies between 80 to 120°F. Pressure is 40 to 50 psi.

(Further information about PVC pipe may be obtained from A. M. Byers Company, Pittsburgh, Pa.)

Check 3863 opposite last page.

"In 35 years on this project, you're the first to ask if I know what I'm doing."

Eaton-Dikeman filter papers help National Foam System fight fire effectively

"Fire fighting foam liquids must be free from all suspended solids to insure chemical stability and satisfactory performance in the equipment in which they are used. We believe our Aer-O-Foam fire fighting foam liquids are the *cleanest* in the world," says D. N. Meldrum, Chemical Director, National Foam System, Inc., West Chester, Pa.

At National Foam, natural protein is hydrolyzed in an alkaline medium and further treated to extract foam stabilizing fractions from the protein. The digested material is filtered through Eaton-Dikeman filter paper grade 953 laid over cloth on a 36" Sperry press to remove undesirable fractions and solid residual material. The use of E-D filter paper with the cloth filter gives National Foam two advantages: (1) a much higher degree of filtration than would be possible with cloth alone, and (2) production costs are cut because the filter cake is built up on the inexpensive filter paper, allowing the more expensive filter cloth to be re-used.

Filtering protein extracts in manufacturing fire fighting foam liquids may not be your particular problem, but whatever you filter, chances are you can do it better, faster and at less expense with one of Eaton-Dikeman's many grades. Why not talk it over with an E-D filtration expert. He will be happy to help you find the right paper for your particular requirement. In the meantime, send for a FREE sample folder of quality E-D papers today.

E D ®

THE EATON-DIKEMAN COMPANY
Filtertown
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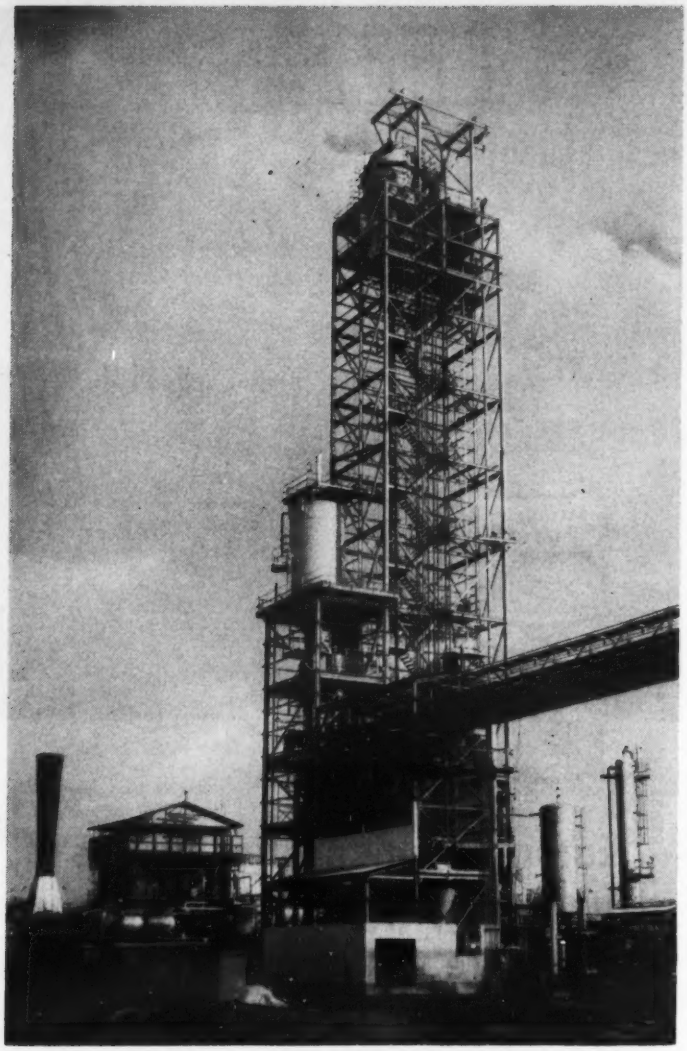
"First with Filter Paper exclusively."

Check 3864 opposite last page.



Closeup view of prill tower with associated processing equipment at bottom and to right, with steam methane reformer at left

Hot Carbamate Solution Recycle Key to Process Used in —

SunOlin Urea Plant

JOHN MELLECKER, Editor-East

NEARING completion at North Claymont, Delaware, is a 222-short-tons-per-stream-day urea plant which holds the attention of urea producers the world over because of a feature of its process.

In this as with other urea plants, NH_3 and CO_2 are reacted to form ammonium carbamate which is dehydrated to urea and water. In the Fauser-Montecatini process used in this new plant, however, part of this water so formed will be used to absorb unreacted NH_3 and CO_2, and will return these reactants to the reactor* in a hot solution form (as dissolved ammonium carbamate) for re-use. In most other urea processes NH_3 and CO_2 are separated. Formation of solid carbamate must be prevented so as to avoid serious clogging of pipes and deposition on vessel walls.

Original basis for new plant was desire of Sun Oil Company to divert part of its (early 1958) NH_3 surplus capacity into urea for industrial and agricultural uses — something not done by any major eastern plant. Olin Mathieson's interest was to equip its established industrial chemicals plant and food sales organizations with urea, to round out their product lines. A large segment of industrial users of urea are located on the eastern seaboard.

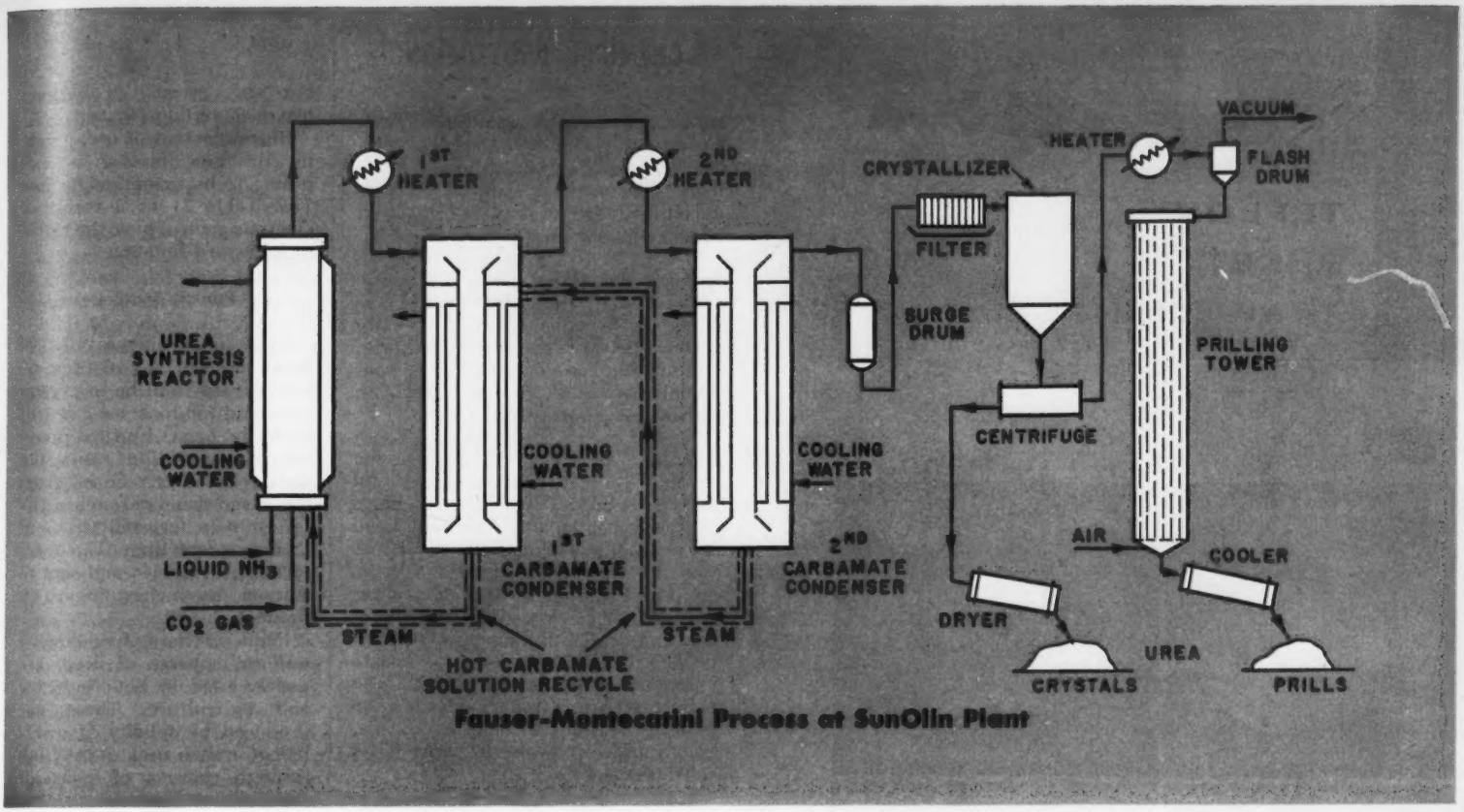
SunOlin, jointly owned affiliate of these companies, was formed in October 1958, about two months after a jointly staffed technical mission team toured Europe, inspecting plants using licensable processes. Choice of this mission was the Fauser-Montecatini hot carbamate solution total recycle (liquid phase) process, as best fitting the SunOlin situation.

Late 1958, M. W. Kellogg began engineering and model building for the urea and related facilities, as a prelude to undertaking the actual construction.

Dual Units

The new urea plant consists of two units. One is the 73,000 ton/yr urea synthesis and product forming unit. The second is a standard Kellogg steam-methane reformer, which will produce the 150 tons of CO_2 needed each day to be reacted with 120 tons of NH_3 supplied by the Sun refinery. The reformer unit will also deliver to the Sun refinery about 10 million cu ft of hydrogen for production of ammonia and for other refining processes. Natural gas feed for the reformer will come from Sun's gas fields in the Gulf Coast through pipelines of Transcontinental Gas Pipeline Corp.

*Only other commercial process available for license known to employ a liquid absorbent recycle medium is Pechiney-Grace, which absorbs carbamate in light mineral oil (1).



Fauser-Montecatini Process at SunOlin Plant

Urea Process

Liquid ammonia is pumped through a steam preheater into the reaction vessel. CO_2 gas is compressed through five stages to 2700 psi reaction pressure, at which point it is introduced into the reactor. Within the reactor, at a temperature of 360°F, a mixture of urea, ammonium carbamate and water is formed exothermically.

Reaction heat tends to raise the temperature; higher temperatures foster the formation of urea but corrosion consideration limits the practical operating temperature inside the reactor. Reactor jacket cooling is provided to control this temperature.

Commercially available stainless steel lines the empty, vertical cylindrical carbon steel reactor. Effluent liquid from the reactor is throttled to a pressure of 200-300 psi in the 1st heater, in which water and unreacted NH_3 are vaporized and carbamate present is decomposed by heat into gaseous CO_2 and NH_3. Vapor-liquid mixture then enters the 1st carbamate condenser, in which gases are separated from urea solution and recondensed as an aqueous solution of ammonium carbamate in the space outside the tube bundle of the vertical, shell and tube surface condenser. Cooling water circulates inside the tubes. This carbamate solution, being kept hot in order to prevent crystallization on the pipes and pumps, is returned to the reactor.

Urea solution from the 1st carbamate condenser, containing residual ammonium carbamate and free NH_3, passes through a second heater and into the 2nd carbamate condenser which operates at atmospheric pressure. In these units the remaining carbamate and free NH_3 are vaporized, recondensed and pumped back as liquid recycle to the first stage carbamate condenser-absorber.

By this means, the total unreacted NH_3 and CO_2 in reactor effluent are recycled to the reactor as a hot aqueous solution of ammonium carbamate. Use of two carbamate condensers and the recycle of hot liquid solutions of ammonium carbamate is said to be unusual in comparison with other available processes. SunOlin believes their use will permit a considerable energy saving over those conventional urea processes which separate and recompress the unreacted NH_3 and CO_2.

Urea solution practically free of unreacted materials, flows from the second stage carbamate condenser to urea surge drum. A minimum inventory is maintained in this drum — just sufficient to assure proper independent operation of the prilling and crystallizing stages which follow.

Biuret, a condensation product made up of two molecules of urea, is highly undesirable in both industrial and certain agricultural grades of urea, not only because of its lower reactivity,

TABLE I

FIVE GRADES OF UREA TO BE PRODUCED BY SUNOLIN PLANT:

Prilled — Fertilizer, industrial, and cattle feed supplement grades.

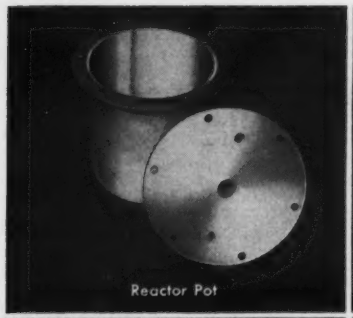
Crystalline — Leaf spray, and industrial grades.

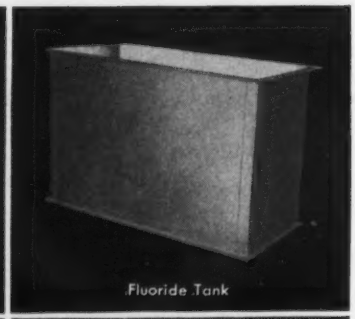
TABLE II

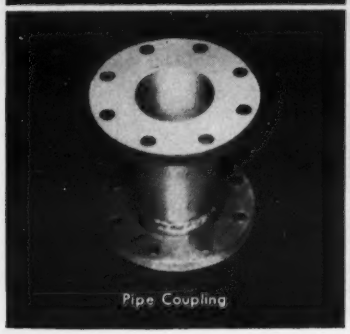
PRODUCT SPECIFICATIONS

	Prilled	Crystalline
Nitrogen	>46% (wt)	>46% (wt)
Biuret	<1.2%	<0.25%
Water	<0.5%	<0.4%
Iron	<4 ppm	<1.5 ppm
Ash	.....	<30 ppm
Free NH_3	.....	<30 ppm
Color of urea-formaldehyde syrup:		APHA 10 mx
Turbidity:		APHA 18 mx

TEFLON* SHEET TANK LININGS







OFFER POSITIVE CHEMICAL PROTECTION

Now commercially available, Tank Linings of Teflon offer the ideal solution to your equipment lining problems. The toughest material yet produced, Teflon gives positive protection against the harshest corrosives.

Hydrochloric, hydrofluoric, and nitric acids, plus the stronger alkalies, oxidants, and solvents cannot harm Teflon Linings. They're easy to clean, non-brittle, non-contaminating, non-flammable, and can be used in **extreme temperatures.**

Anti-stick service. For applications where extremely low coefficient of friction is indicated, Teflon Linings can be cemented with excellent bond strength. Typical uses range all the way from frictionless liners for ducts, hoppers and tanks to the facing of aircraft skis; from easy to clean, bacteria-free, non-contaminating work surfaces in food and pharmaceutical plants to frictionless facings for valves and machine parts; from guide-rails on industry's countless packaging machines and conveyors, to paper dryer rolls; on candy molds.

Applied widely by carefully selected and authorized applicators. The experience and "know-how" of these tank lining experts guarantee satisfactory Teflon Lining installation, prevent expensive failure due to improper application. Approved applicators include:

The Barber-Webb Company, Inc.,
Los Angeles, Calif.

Belke Mfg. Co., Inc.,
Chicago, Illinois

Buckley Iron Works,
Dorchester, Mass.

Electro-Chemical Engr. & Mfg. Co.,
Emmaus, Pa.

Linco, Inc.,
Houston, Texas

Mercer Rubber Corp.,
Little Ferry, N. J.

Metalweld, Inc.,
Philadelphia, Pa.

GARLOCK

Visit Us at the Corrosion Show—Booth 112

You can also obtain details on Teflon Linings by writing to Special Products Dept., The Garlock Packing Company, Camden 1, New Jersey.

*DuPont Trademark for TFE Fluorocarbon Resin

Check 3865 opposite last page.

but also because it withers leaves of certain plants.

Biuret content of urea made by the new process is expected to be exceptionally low (see Table 2) as a result of rigorous control over the time-temperature function.

Product Forming

Of a total amount of 200 short tons per day of urea, 50 tons per day will be in crystal form and 150 tons per day will be in the form of prilled product. For crystalline urea the urea solution is pumped from the surge drum through a filter into a crystallizer, and then to a centrifuge. The crystals are then dried and sent to storage as highest purity product.

Prills, or hard, free-flowing uniform spheres of urea, are widely used in both industry and agriculture. These are produced by solidifying droplets of molten urea as they fall through a stream of rising air in a prilling tower.

Preparation of the solution prior to its entering the prilling tower consists of quickly reducing its water content in a vacuum, specially designed flash evaporator. Time of residence is short to minimize biuret formation. With this innovation it is expected that urea delivered to prill tower area will contain less than 0.35% moisture content. Conventional limit of concentration is said to be 3 to 4% moisture content, throwing a heavier load on the rotary drying unit which in conventional processes follows the prill tower. This process, however, does not need such a dryer. High-density, hard, free-flowing prills are thus obtained avoiding the use of a dryer which causes the prills to become porous and brittle.

Another special feature of the urea plant is its prilling tower. When SunOlin's technical mission was touring the urea plants of Europe, it was particularly impressed with the stable operation of the prilling tower in a urea plant at Sluiskil, Netherlands, operated by Compagnie Neerlandaise de L'Azote (Associate

of Montecatini). SunOlin used the Sluiskil unit's features in the urea plant design.

Conveying and Storage

All handling of urea product will be in contact with stainless steel and aluminum equipment. Even the storage building — designed to handle 12,000 tons in bulk — is made of aluminum and concrete. This is important in producing white urea for colorless urea-formaldehyde polymers. Whiteness of the urea product is important for obtaining satisfactory consumer acceptance. Off-white material is said to contain impurities.

Color in urea is generally due to the presence of corrosion products. The exceptional whiteness expected of the product is evidence that there is no corrosion and that long equipment life may be expected. The high-purity prilled urea made by the process is suitable as cattle feed supplement, in which case the nitrogen of urea is used for the synthesis of proteins and the activity of bacteria is stimulated making easier the digestion of hay, straw and other forages in the stomachs of ruminants.

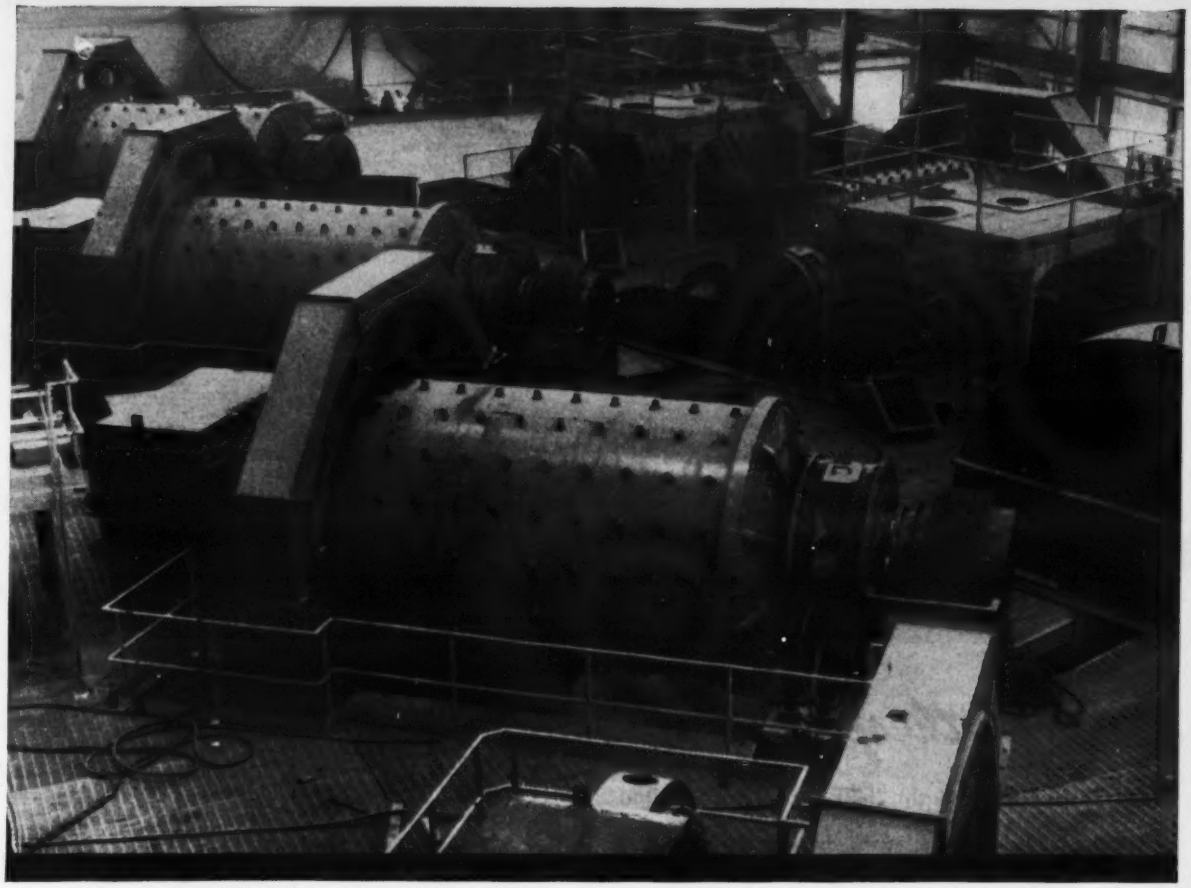
Design requires no unusual instrumentation. An infrared analyzer is used in the steam methane reformer unit. Process water will be cooled by cooling tower. Makeup water will be taken from the Delaware River. Special recovery equipment is installed to prevent any objectionable emission of NH_3. The combined units will be operated by a normal staff of six direct operating personnel per shift.

(Engineering details on the SunOlin plant can be obtained from engineer-constructor, M. W. Kellogg Co., 711 Third Ave., New York 17, N.Y.)

Check 3866 opposite last page.

(Additional information about the Fauser-Montecatini urea process can be obtained from Chemore Corporation, 2 Broadway, New York, N.Y.)

Check 4391 opposite last page.



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KENNEDY Ball and Rod Mills solve the toughest grinding problems by providing dependable wet or dry grinding at low cost and with minimum maintenance. Consult KENNEDY and learn more about these features that distinguish KENNEDY Grinding Mills:

- Cast steel or Meehanite heads
- Welded and stress-relieved heavy steel plate shells
- Large diameter trunnions
- Self-aligning bearings with adjustable sole plates
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Check 3867 opposite last page.

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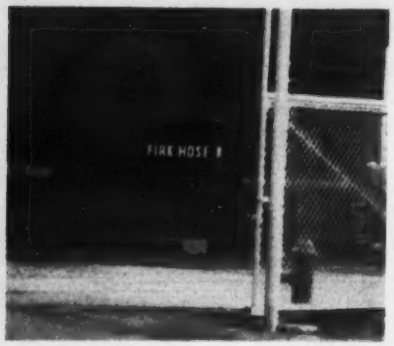
"SYN-FLEX"

U.S. PAT. NO. 2392967



Lightweight

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FIRE HOSE

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1—Basic lightweight "FIRE-FLEX" construction . . . 50' coil of 2" weighs only 35½ lbs., with diameter of only 22". Compare *that* with regular rubber-covered fire hose!

2—Black "Synplastic"® cover is highly resistant to abrasion and action of chemicals, oils, grease.

3—Does not require drying after use.

4—Extremely flexible . . . easy to handle.

5—ECONOMICAL because of its long service life.

300 LB. TEST

"SYNFLEX" is a modern fire hose especially designed for the Chemical, Petroleum and allied industries.

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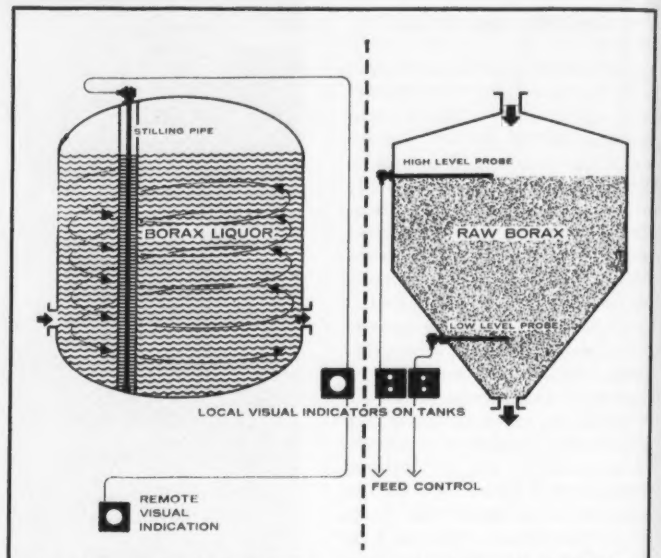
Check 3868 opposite last page.

NEW SOLUTIONS
of processing problems



Level in process tank (left) is monitored by continous indicator. Low-level signal actuates control valve which admits necessary amount of raw product to keep needed volume in tank. High- and low-level probes of detector system in storage tank (right) monitor level of raw borax ore. Variations in level above and/or below probes result in adjustment of input flow to bring level back within limits

Probe-type capacitance-bridge indicators and detectors have shrugged off effects of heavy, abrasive ores which encrustate excessively, in making sure that . . .

Borax-ore-tank levels are kept in bounds

Problem: Heavy, constantly shifting, abrasive condition of ores utilized in borax processing, coupled with their crystallization tendencies, severely limited choice of level-indicating or detecting devices in processing and storage tanks at proposed plants of United States Borax and Chemical Corporation in Boron, California.

In addition to being physically durable, any detecting or indicating devices utilized could not be hampered as to accuracy by excessive encrustation.

Maintenance of adequate raw-borax-ore levels in storage tanks and assurance of needed raw-product-intake rate into borax-liquor processing tanks were considered essential conditions of operation.

Incoming ore is run-of-mine chunk type. It is wetted during processing. (Both saturated and super-saturated forms are utilized.) Crystallization and purification by remelting are incorporated in process.

Storage tanks are 150 to 200′ tall and approximately

50′ in diameter. Processing tanks are 20 to 30′ in height and diameter.

Solution: Probe-type capacitance-bridge level detectors and continuous level indicators were installed to maintain storage-tank levels within acceptable limits and to ensure proper raw-product-intake rate to processing tanks.

Level detectors are used in pairs as high-low level monitors in raw-borax-ore storage tanks. Probes are installed in tank sides at critical high and low levels. Variations in level above and/or below probes actuate relay-operated switch. Resulting signal operates local visual indicator and controls input flow to tank, so as to adjust to within high-low limits.

Level Indicators

Continuous level indicators are installed in processing tanks of borax liquor. In each tank a flexible Teflon-covered capacitance probe is mounted vertically, through top of tank, in stilling pipe (four to six inches in diameter).

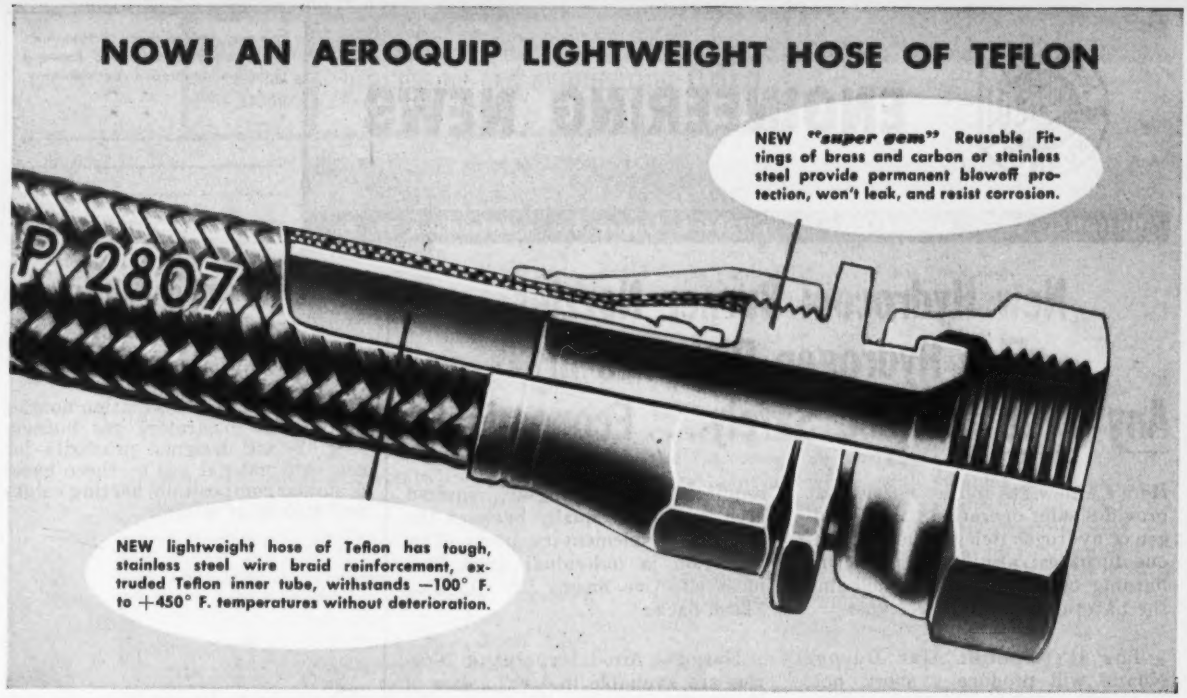
As liquor level drops below preset range point in tank, signal is actuated which operates local and remote visual indicator units. Also, signal is converted to air pressure to control valves which admit raw product to tank. Feed rate is thus varied to maintain level within preset control range.

Fixed-level detectors, of type used on storage tanks, are employed in process tanks. They serve as safety monitoring devices in event of level-indicating-system malfunction.

Indicators and detectors operate on capacitance-bridge principle. Bridge is unbalanced by increase or decrease of probe capacitance. This is caused by change in dielectric constant initiated by varying level within tank. They operate from 115v 60-cy power.

Results: Level detectors and continuous indicators have successfully maintained ade-

NOW! AN AEROQUIP LIGHTWEIGHT HOSE OF TEFLON


NEW "super gem" Reusable Fittings of brass and carbon or stainless steel provide permanent blowoff protection, won't leak, and resist corrosion.
P-2807
NEW lightweight hose of Teflon has tough, stainless steel wire braid reinforcement, extruded Teflon inner tube, withstands —100° F. to +450° F. temperatures without deterioration.

New Design Reduces Cost of Hose of Teflon

LOWER COST OF NEW AEROQUIP 2807 & 2808 HOSE OF TEFLON PERMITS WIDE USE BY DESIGNERS OF EQUIPMENT USING CHEMICALS AND STEAM

Development of Aeroquip 2807 and 2808 Hose of Teflon extends the practical use of this high temperature, chemically inert hose type to many new applications. The new lightweight design of both Hose of Teflon and its patented* "super gem" Reusable Fitting achieves a manufacturing savings compared to other Teflon hose, without sacrifice in quality. This savings is passed on to you.

Exceptionally long service life is possible in steam and chemical use, even where flexing and vibration are constant problems. Operating temperature limits are —100° F. to +450° F.† The unique "super gem" Fittings are leakproof and blowoff proof, yet can be detached and reused again and again. Fitting styles available include male pipe, J. I. C. swivel and 2-bolt swivel flange ends.

For complete engineering data on Aeroquip 2807 and 2808 Hose of Teflon, fill in and mail the coupon below.

†For applications requiring higher temperatures, please contact Aeroquip's engineering department.

Hose No.	O.D. Tube Size	Working Pres., psi. Steam*	Working Pres., psi. Chemical	Min. Burst psi.	Min. Bend Rad., Ins.
2807-4	¼	200	1500	10000	2
2807-5	5/16	200	1500	9000	3
2807-6	⅜	200	1500	8000	4
2807-8	½	200	1000	6000	5¼
2807-10	⅝	200	800	6000	6½
2807-12	¾	200	800	5000	7¾
2807-16	1	200	800	3500	9
2807-20	1¼	200	600	2800	16
2808-8	½	200	1500	8000	4⅝
2808-10	⅝	200	1500	8000	5½
2808-12	¾	200	1000	8000	6½
2808-16	1	200	1000	5000	7⅜
2808-20	1¼	200	800	4000	11

*388° F. maximum recommended steam temperature

Aeroquip offers a complete Fluid Piping Service to equipment manufacturers, with assistance in any phase of manufacture.

- DESIGN
- PROTOTYPE
- PRODUCTION
- FIELD SERVICE
- SERVICE PARTS

"super gem" is an Aeroquip trademark. *U.S. Patent Nos. 2,833,567 and 2,731,279. Teflon is DuPont's tradename for its tetrafluoroethylene resin

Aeroquip

CP-3

Aeroquip Corporation, Jackson, Michigan
Please send me a copy of Bulletin IEB-50 covering 2807 and 2808 Hose for steam and chemical applications.

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Company_____

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Check 3869 opposite last page.

ENGINEERING NEWS

NATIONAL AIROIL BURNER CO., INC. • 1284 E. Sedgley Ave. • Philadelphia 34, Pa.

You may wish to check certain items in this advertisement and forward to those concerned in your company.

ROUTE TO:

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New Hydrocool Burner Nozzles Fire Hydrogen Rich Gas in Any Type Furnace Safely . . . Economically

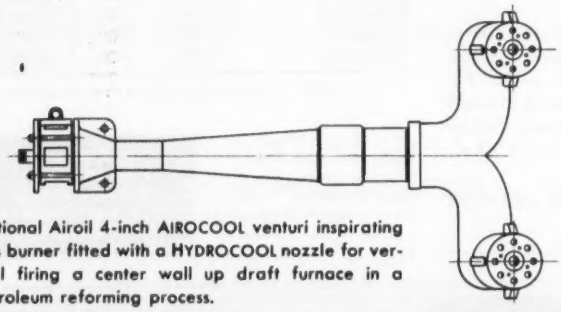
Here's a new gas burner nozzle that provides safer operation with hydrogen or hydrogen rich gas fuels in various furnaces; also assures efficient burning of any other gas including the natural or by-product types.

The HYDROCOOL Gas Burner Nozzle will produce a short, hot, stable flame with a high turn-down ratio, and with extremely low excess air in the nozzle. This nozzle is an excellent replacement for other makes of nozzles where the previously used high density gas has now been replaced by hydrogen.

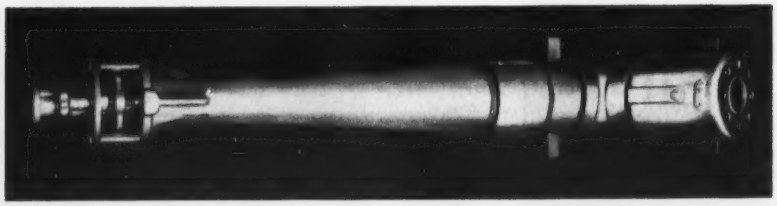
In the HYDROCOOL Nozzle *one main* port and a circle of eight supplementary ports collectively have the same area and consequently the same mixture velocity as the single port of a conventional nozzle. However, on the HYDROCOOL Nozzle, its main port has 50% of the total area required. The remaining 50% required area is divided equally between the 8 to 16 supplementary ports. This reduction in individual areas is a most effective means for retarding "flash-backs."

National Airoil HYDROCOOL Nozzles are available in I.P.T. sizes of 3", 4", 6" and 8". They can be a part of combination gas and oil burner units or where necessary, may be machined to produce a shorter flaring gas flame as compared with other nozzles.

Bulletin 57 contains engineering details and other data on HYDROCOOL Nozzles. Write for a free copy today.



National Airoil 4-inch AIROCOOL venturi inspirating gas burner fitted with a HYDROCOOL nozzle for vertical firing a center wall up draft furnace in a petroleum reforming process.



National Airoil 4-inch AIROCOOL venturi inspirating burner having finger control register for primary air. Also equipped with twin 3-inch HYDROCOOL nozzles for firing against a radiating wall in center wall up draft heaters.

Check 3870 opposite last page.

Why Conventional Nozzles are Unsatisfactory for Firing Hydrogen Gas

Conventional flame retention nozzles for venturi inspirating gas burners (Fig. 1) are designed primarily for use with natural gas or those gases of similar composition, heating values and molecular weights.

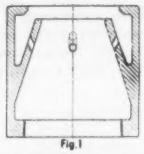


Fig. 1

In firing hydrogen, however, considerable difficulty is encountered, causing mixture "flash-back" to produce an initial explosion and/or continuous burning back within the venturi tube.

Further difficulty is encountered when plant personnel endeavor to correct the condition by disproportionately reducing the primary air to the venturi. The effect of this excessive adjustment is to lengthen the gas flames and risk secondary combustion around the tubes of the convection section in petroleum heaters. These longer and less concentrated furnace flames tend to reduce the heat absorbed by the wall radiant tubes. They also cause inefficient fuel performance by requiring a higher excess air that increases both the stack gas temperature and the fuel consumption.

In some center wall up draft petroleum heaters, the conventional nozzles are burned so badly that gas flames frequently take place in the combustion air ducts under the furnace floor. Photos A and B show the remains of two conventional nozzles that deteriorated after only a few months' duty. With the average center wall up draft heater, it is an expensive undertaking to remove the burners, renew the nozzles and replace the burners. The cost in time and labor greatly exceed the purchase price of the nozzles themselves.

A B

NEW SOLUTIONS

quate levels in raw-borax-ore storage tanks and satisfactory raw-product feed rate to processing tanks.

Probes have given reliable service free from prohibitive maintenance. Zero-point checks on the continuous level-measurement systems are easily made during routine, periodic probe inspections.

(Level-Tel continuous level indicators and Level-Tek level detectors are products of Aeronautical and Instrument Division, Robertshaw-Fulton Controls Company, Santa Ana Freeway at Euclid Ave., Anaheim, Calif.)

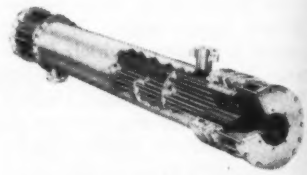
Check 3871 opposite last page.

Savings of $9000/year made with impervious graphite evaporator

Unit in corrosive service needs no maintenance

Problem: Estimated cost of maintenance and repair for metal shell-and-tube evaporator in use at National Southern Products Corporation, Tuscaloosa, Alabama, was $8000-$10,000 per year.

Evaporator was in use in an acid refining process involving solvent and tall oil. Resulting refined tall oil is used as a lubricant and as a vehicle for paint, varnish, detergents and soap.



Impervious graphite exchanger cuts maintenance costs

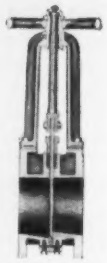
Solution: Plant installed a shell-and-tube evaporator made of impervious graphite. This material is uneffected by practically all corrosives except a few highly oxidizing agents.

Impervious graphite heat exchangers are available as standardized assemblies from stock component parts in ca-

To page 62

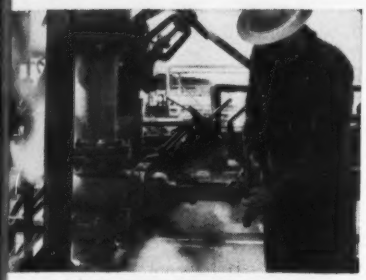
PROCESS PIPING POINTERS

Special design stainless valve for corrosive pulp stock



The knife-edge disc in this valve working with notched body outlet shears pulp fibers to make tight closure. Body and disc of stainless steel, and Exelloy stem, provide maximum corrosion resistance. New weight-saving, short face-to-face—ideal for use with light wall pipe. The Type 316 cast steel body is rigid and dimensionally accurate. This valve recommended where corrosion and clogging of pulp lines is a problem. Sizes to 16 in. Get circular AD-2156—see below.

High nickel-chrome stainless valve for sulphuric acid



This "Craneloy 20" gate valve was specially designed for handling sulphuric acid at elevated temperatures in a wide range of concentrations. Unique split wedge disc, free to rotate, gives increased resistance to corrosion and wear. Sizes ½ to 12 in.; flanged ends. Globe and check patterns also made. Get bulletin AD-2411. See below.

200-pound bronze valves have new strength and safety

Newest design in bronze gate valves features cylindrical body shape, same as used for high-pressure steel valves. It eliminates pinched effect on old rectangular body between ends and bonnet joint. Permits better, stronger integration of hex ends and body; provides wider wrench grip surfaces. Internally the circular body prevents stress concentration by uniformly distributing pressure load on body wall. For more data and literature, write for bulletin AD-2285.

For literature or data on product listed above, please contact R. E. Catlett, Manager, Chemical Sales Dept. No obligation.

CRANE

CRANE CO. Industrial Products Corp.
4100 South Kedzie Ave., Chicago 32, Illinois
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PLUMBING • HEATING • AIR CONDITIONING

Check 3872 opposite last page.

CUT HERE AND FILE

Correction of Boiling Points

B. W. HIGDON
Celanese Corporation of America
Pampa, Texas

and

D. S. DAVIS
Head, Department of Pulp and Paper Technology
University of Alabama

For pressures near atmospheric, correction of boiling points of pure liquids to 760 mm of mercury can be made by means of equation:

$$\Delta t = \frac{(t+273)\Delta p}{K}$$

based on an expression given by Hoyt[2]

where: Δt = correction to boiling point, °C
t = observed boiling point, °C (at observed pressure)
Δp = 760 − observed pressure, mm Hg
K = 8000 for hydrocarbons, halogen derivatives, ethers, aldehydes, and all normal liquids; 8250 for ketones and esters; 8500 for amines; and 10,000 for water and lower alcohols

Note: Signs of Δt and Δp are always alike.

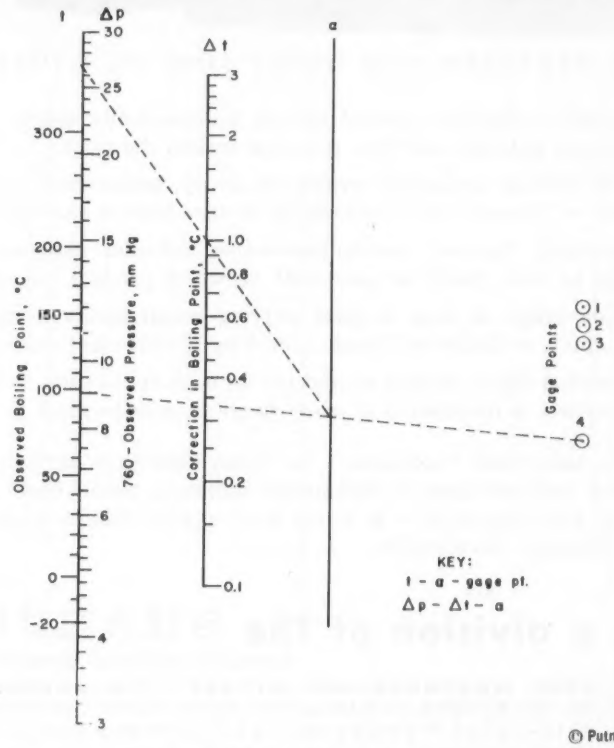
Typical Example

Use of accompanying nomograph, constructed in accordance with well-known methods[1], to solve this equation is illustrated as follows: What correction should be added to the boiling point of water, observed to be 99°C at pressure of 733.3 mm of mercury, to arrive at the boiling point at pressure of 760 mm? Connect 99° on the t scale and 4, the gage point for water, with straight line. Connect intersection with α axis and 760 — 733.3 or 26.7 mm on Δ p scale with straight line. Intersection with Δ t scale is 1.0°C, desired correction to add to 99°C to attain 100°C, boiling point of water at one atmosphere pressure.

LITERATURE CITED:

1) Davis, D. S., "Nomography and Empirical Equations," Chap. 6, Reinhold Publishing Corporation, New York (1955).
2) Hoyt, C. S., J. Chem. Ed., Vol. 11, 405 (1934).

Gage Points	Compounds
1	Hydrocarbons, halogen derivatives, ethers, aldehydes
2	Ketones, esters
3	Amines
4	Water, lower alcohols



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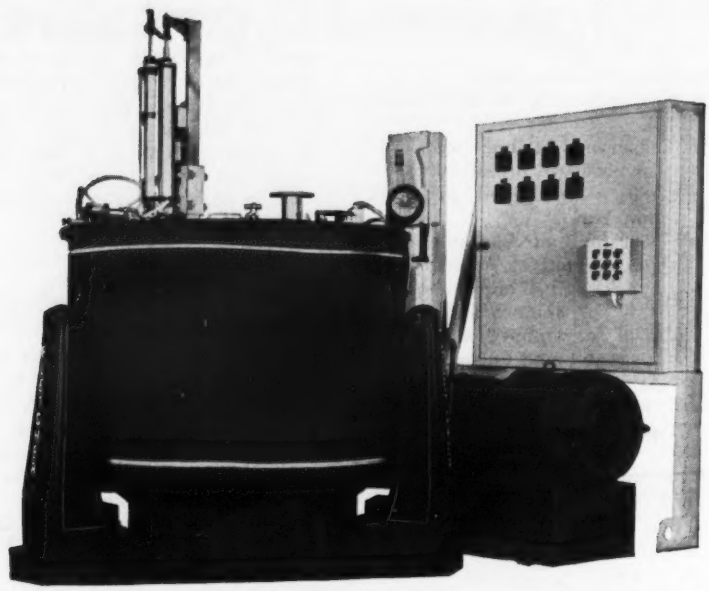
take another look at the FLETCHER TORNADO-MATIC



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NEW SOLUTIONS

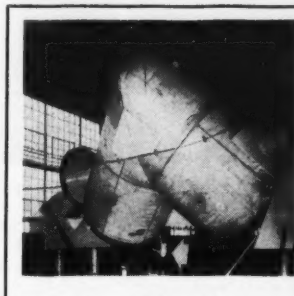
From page 60

pacities from 7.5 to 2300 sq ft of heat transfer surface. Unit at Southern Products is standard with a special vapor-head entrainment separator.

Results: Impervious graphite evaporator has required no maintenance during the more than 18 months it has been in service. It provides an annual saving of $8000-$10,000.

(Impervious graphite evaporator is product of Falls Industries, Inc., Aurora Road, Solon, Ohio.)

Check 3874 opposite last page.



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(Twin shell blender was manufactured by the Patterson-Kelley Co., Inc., East Stroudsburg, Pa.)

Check 3875 opp. last page.

Treat twice as much water, save $200,000 per yr at Hanford plant

Twice as much water is being purified at savings of more than $200,000 per year at Hanford Atomic Products Operation, General Electric Company, Richland, Wash-

To page 64

A
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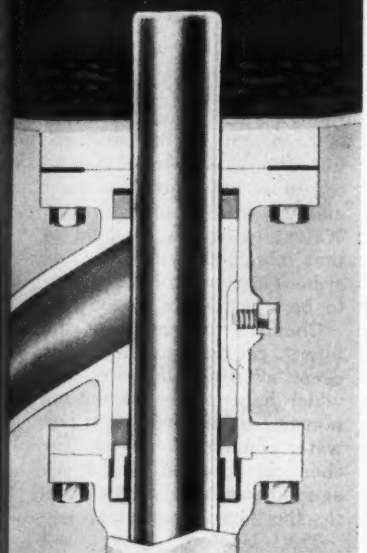

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CUT HERE AND FILE

Air Required for a Water Air Lift

CLIFFORD L. DUCKWORTH
East Alton, Illinois

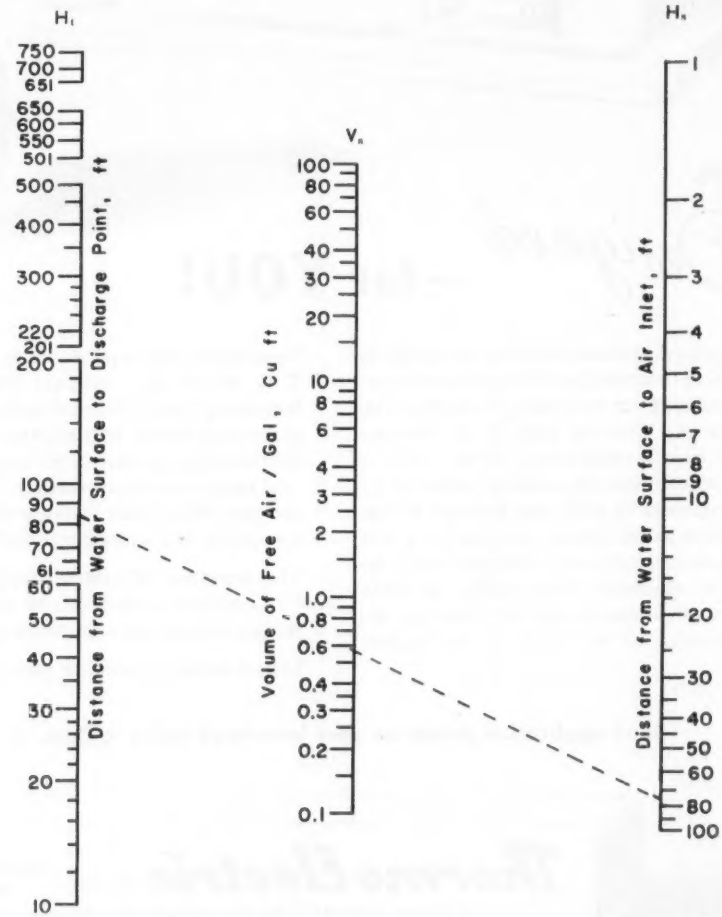
The volume of free air required to lift one gal of water has been expressed by the formula:

$$V_a = \frac{0.8\ H_s}{C \cdot \log \frac{H_s + 34}{34}}$$

In this formula, H_t is total lift in ft (distance from working surface of water to point of discharge); H_s is running submergence in ft (distance from water level to point of air inlet); and C is a constant, varying with head required. V_a is volume of air in cu ft required to lift one gal of water. Variance of C has been incorporated in interrupted H_t scale. Accordingly, it is necessary only to connect values of H_t and H_s to determine V_a.

Typical Example

It is desired to raise water 85′ from a well where air inlet of air lift is 75′ below water level. Connecting two scales at values indicated shows that 0.58 cu ft of air will be required to lift one gal.



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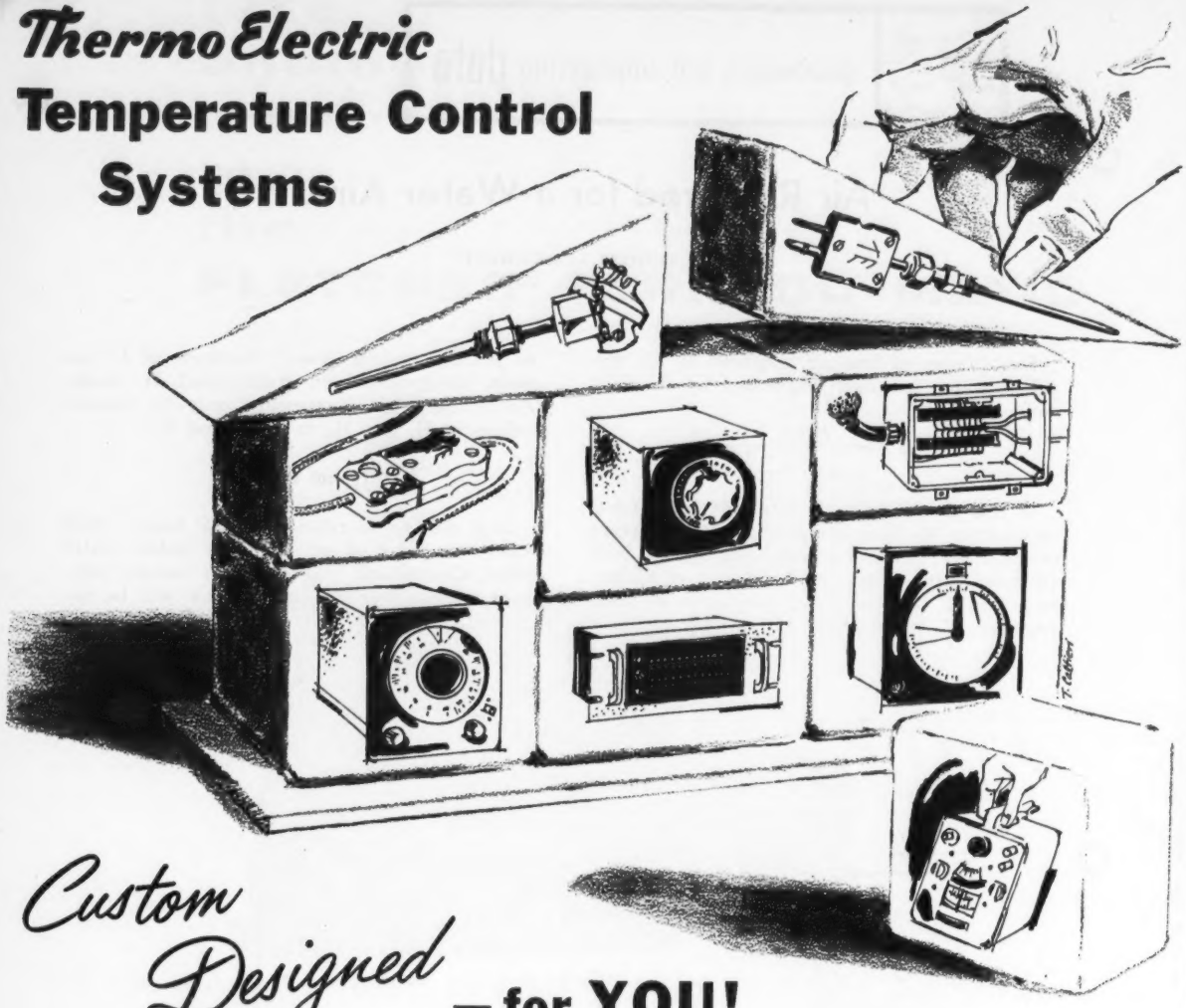
Thermo Electric Temperature Control Systems



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Thermo Electric CO., INC. SADDLE BROOK, NEW JERSEY

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NEW SOLUTIONS

From page 62

ington. Key to these benefits are modifications made in plant's water filters plus the addition of a chemical conditioning treatment for the filters.

Higher throughput rates were achieved by changing composition of sand, gravel and anthrafilt (anthracite coal, carefully sized) used in the filter beds and switching to relatively larger particle sizes.

Previous filters had 10" of sand, 10" of gravel, and 20" of anthrafilt. In the new set-up, units have same amount of gravel but 3 to 6" of sand and 24 to 27" of anthrafilt. Water quality is as good as that obtained with previous system and control is reported to be much more flexible.

Chemical treatment of the filters consists of adding a preparation to the filter bed which helps to absorb and retain fine solid particles in raw water coming from river. The chemical is added after a coagulant has been used to settle the larger particles.

The Hanford plant uses millions of gal of pure water a day to remove heat produced in eight nuclear reactors stationed along the Columbia river.

(Information courtesy of Hanford Atomic Products Operation, General Electric Co., Richland, Washington.)

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Check 3877 opposite last page.

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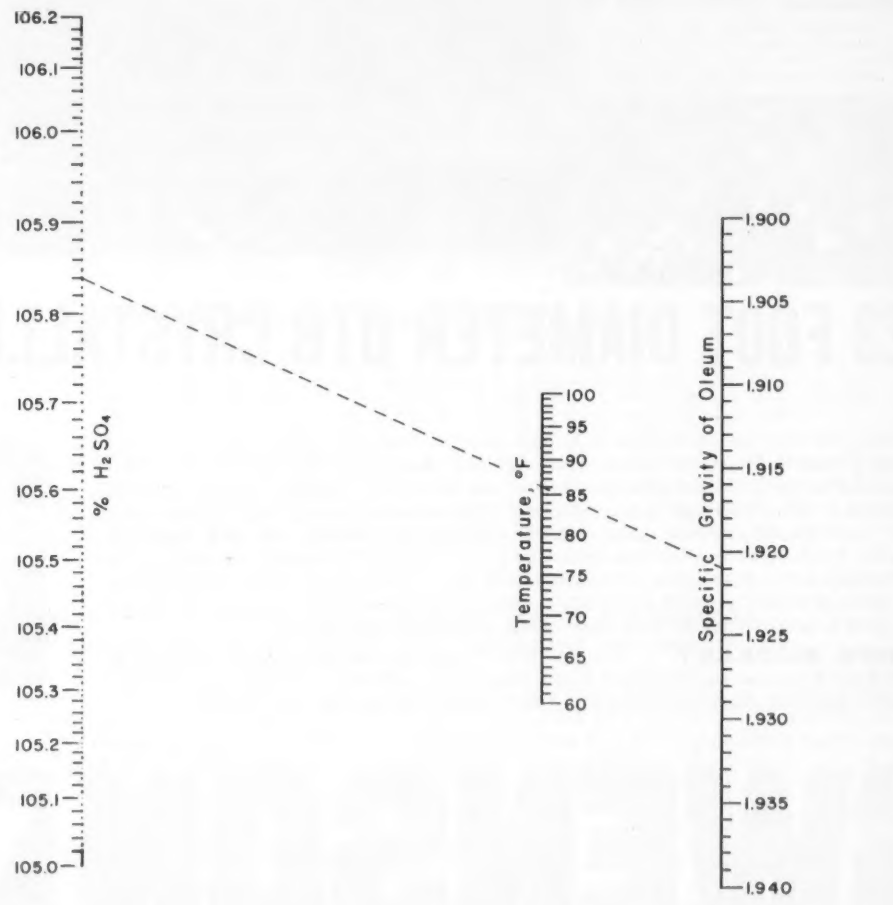
Specific Gravity of 25% Oleum

LESLIE L. VIZSALYI and HARRY A. ARBIT
Stauffer Chemical Company
Vernon, California

In manufacture, storage and shipping of 25% oleum it is necessary to know specific gravities of various concentrations of this material at different temperatures.

Through use of a standard reference (once sulfuric-acid content of the oleum is determined by titration), "percent 100% H_2SO_4" is converted to "percent total SO_3" in one table. Next "percent total SO_3" is converted to specific gravity at a standard temperature in another table. Final conversion is to specific gravity at desired temperature by applying correction factors.

Accompanying nomograph directly gives specific gravity of varying concentrations of 25% oleum at different temperatures. At 86°F an oleum containing 105.84% sulfuric acid has a specific gravity of 1.921 (compared to water at 60°F).



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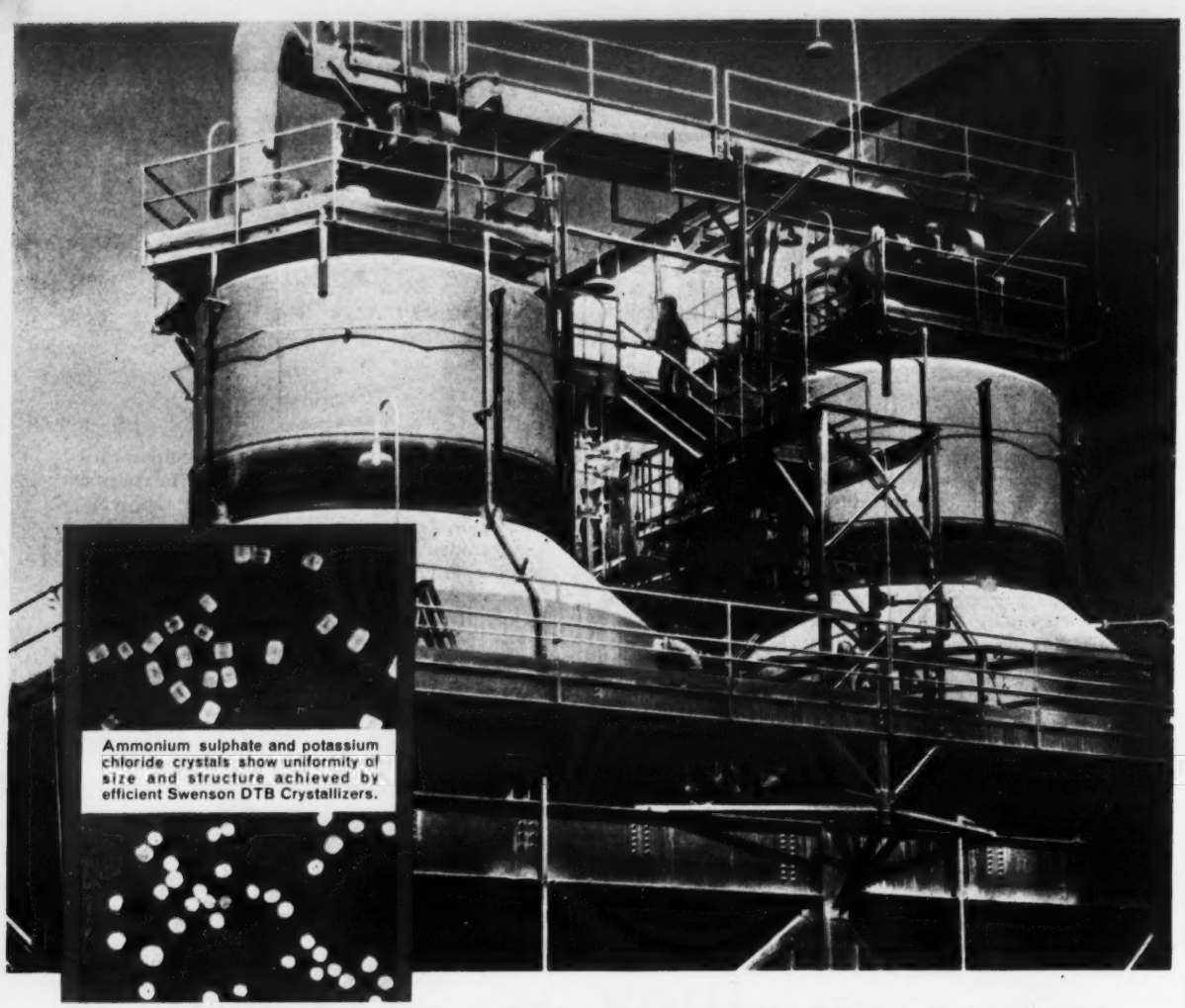
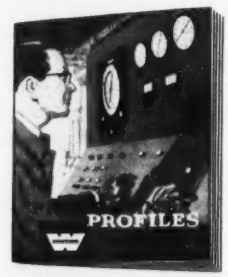

Ammonium sulphate and potassium chloride crystals show uniformity of size and structure achieved by efficient Swenson DTB Crystallizers.

23 FOOT DIAMETER DTB CRYSTALLIZERS

PRODUCE BETTER SALTS

Potassium chloride production is in high gear at American Potash and Chemical Corporation of Trona, California. Their two new Swenson DTB Crystallizers (draft-tube, baffle-type), the largest ever built, produce potassium chloride from concentrated brine at a remarkably high production rate. The new equipment produces large, uniform crystals of premium value—does it with low wall salting, and long operating cycles, because of its simplified basic design. Versatile DTB Crystallizers are readily adaptable to the production of many different salts. Their demonstrated performance in terms of crystal size and uniformity is convincing manufacturers everywhere to turn to DTB Crystallizers. Call Swenson—leader in the field—for details.



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Check 3878 opposite last page.

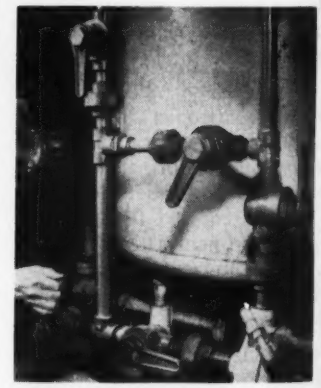
Valve problem conquered by PVC

Problem: Several types of metal valves used for handling 93% sulfuric acid at The Upjohn Company, Kalamazoo, Mich., lasted five months or less before corrosion forced a shut down for replacement.

Plant uses sulfuric acid to regenerate a mineral bed for deionized water used in production of pharmaceuticals. Concentrated acid is drawn from carboys by vacuum, so valve mounted on outlet side of vacuum tank must provide tight seal as well as resist corrosion. After vacuum is released, valve is opened to feed the acid into a larger tank below to be mixed into a 15 to 17% solution.

Solution: Three years ago Upjohn installed a ¾" injection-molded, unplasticized PVC valve on tank.

Results: The PVC plug valve has shown no signs of corrosion during three years it has been in service.



These five plug valves have given maintenance-free service on 93% sulfuric acid since May 1957

After this PVC valve proved to be successful in 93% sulfuric acid service, a second installation of several similar valves was made in May 1957. Valves also handle 93% sulfuric at ambient temperature and 40 psi. They have given excellent service.

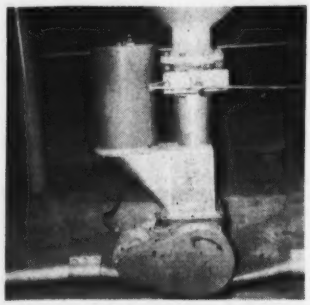
(PVC plug valves are product of Tube Turns Plastics, Inc., 2929 Magazine Street, Louisville 11, Ky.)

Check 3879 opposite last page.

Plant speeds operations, moves polystyrene with air conveyor

System can handle up to 4000 lb per hr

Problem: When Lincoln Plastics Corporation, Stamford, Connecticut, installed their polymerization unit, they required a fast and efficient method of transferring



Close-up of devices installed on bottom of storage tanks. Each tank is equipped with slide gate, blow-back filter, and rotary valve

diced polystyrene from three 50,000 lb capacity outside storage tanks to a large holding tank on roof of building. Purpose was to speed processing and reduce handling and storage costs.

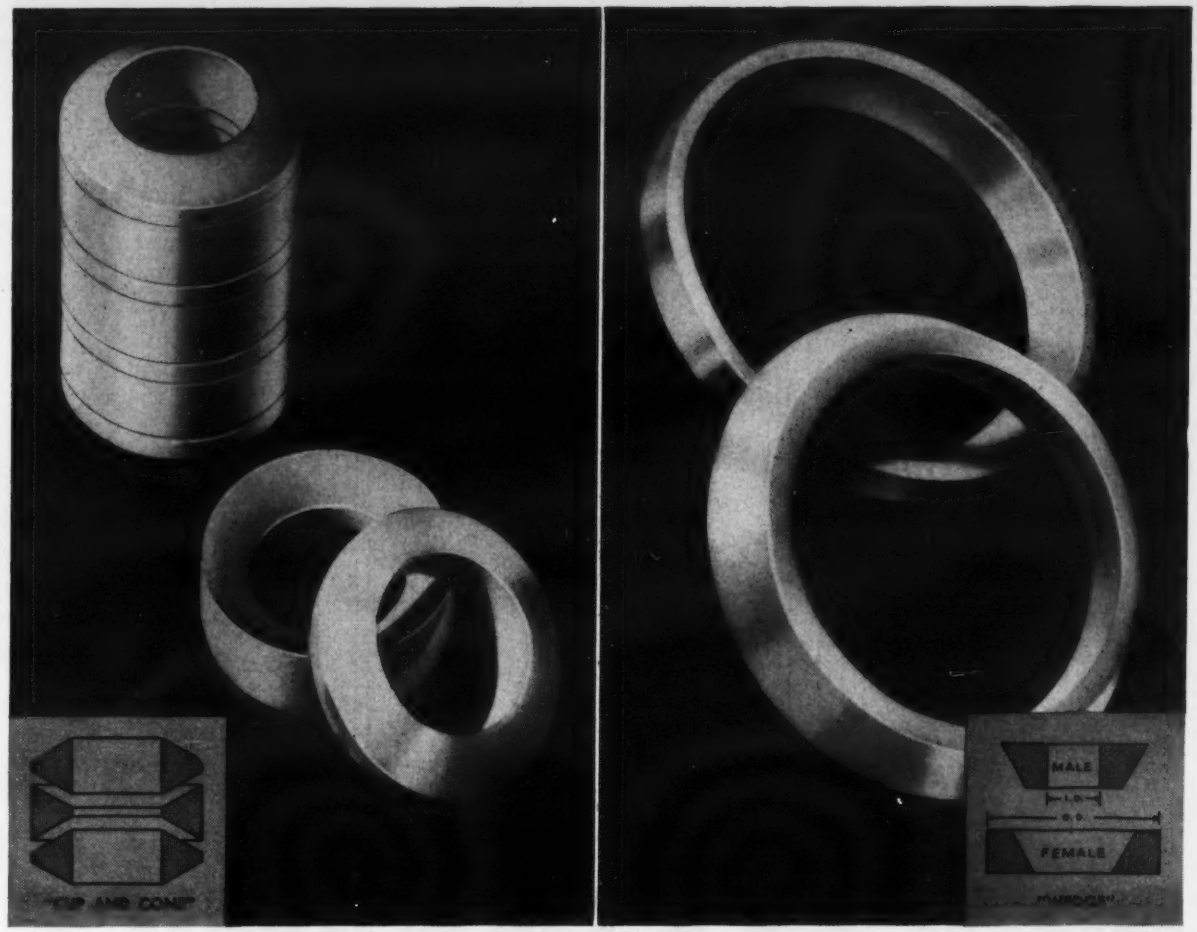
The company manufactures plastic wall tile and a variety of products in both crystal and high impact polystyrene.

Solution: A positive pressure pneumatic conveying system was installed. The installation involves a horizontal run of 40 ft and a vertical lift of 70 ft or more.

Results: The pneumatic system transfers polystyrene from the storage tanks to the holding tank at rates up to 4000 lb per hr. All movement of material is controlled at a central push-button switching station. Operations are clean, fast, and accurate, and provide optimum flexibility in addition.

(Pneumatic conveying systems are product of Sprout-Waldron & Company, Incorporated, 130 Logan Street, Muncy, Pennsylvania.)

Check 3880 opposite last page.



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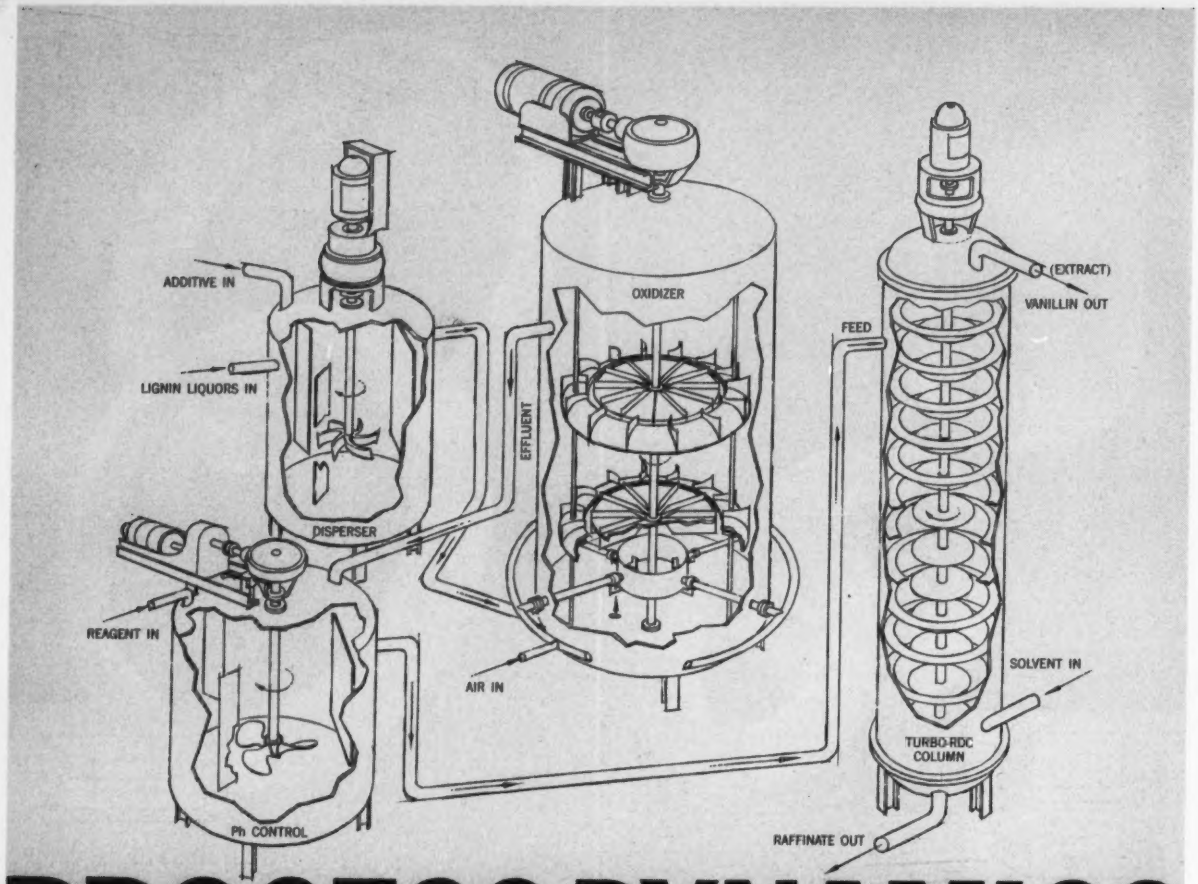

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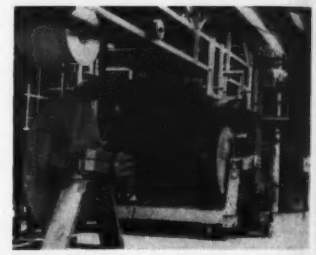
Check 3882 opposite last page.

Device ups flexibility, reduces drying time of vulcanized fiber

Provides automatic control of temperature, humidity

Pre-drying of vulcanized fiber has cut overall drying time and boosted drying capacity at Taylor Fibre Co., Norristown, Pa. The pre-drying operation is being conducted in an efficient machine known as a fiber conditioner.

Installed recently at a cost of approximately $250,000, the equipment partially dries vulcanized fiber after it leaves curing bath and before final drying in calendering rolls. In addition to providing automatic and close regulation of temperature, conditioner also controls humidity.



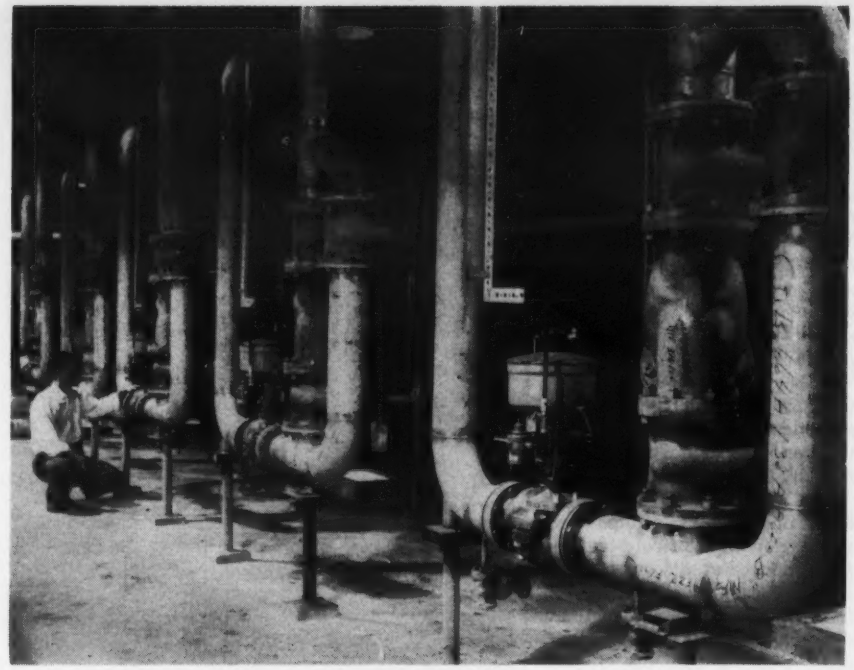
Conditioner cuts drying time, improves flexibility of vulcanized fiber

Unit has four ovens which dry the web on top and bottom. Moisture content is cut from approximately 60 to 15 percent in 250 ft of travel. Web floats through unit on rollers rather than being pulled through under tension. Individual fibers are not embrittled by stretching.

Also, since fibers are not pulled longitudinally as they dry, but are interwoven, finished material can be formed or bent equally well in any direction. These qualities are highly desirable in manufacturing tote boxes, abrasive discs, safety masks, and other products manufactured by Taylor.

(Vulcanized fiber conditioner was engineered by Frank W. Egan & Co., Somerville, New Jersey.)

Check 3883 opposite last page.



Pneumatically controlled valves in six-inch lines to brine coolers maintain solvent-bath temperature to ± 2° at American Cyanamid's Santa Rosa, acrylic fiber plant

Keeping acrylic fiber* production within narrow limits of acceptable quality imposes particularly critical processing conditions. At American Cyanamid's 27-million-lb/yr plant, important links in dependable repeatable control chain are . . .

Accurate Control Valves Hold Flow to ± 0.1%

PROBLEM: Upset of as little as 1% in individual control can throw production into reject range in manufacture of American Cyanamid's acrylic fiber. At Cyanamid's Santa Rosa plant near Pensacola, Florida, fiber is produced in a continuous, straight-line process. To maintain required over-all accuracy of ±1%, flow of reacting components must be controlled within ±0.25%, and in some instances ±0.10% where flows are small.

Acrylic fiber is made from acrylonitrile and minor amounts of other monomers through catalytic polymerization. Fiber is prepared by extrusion of copolymer into a precipitating bath of dilute sodium thiocyanate[1]. Proportions of monomers going into reactors are extremely critical.

Monomers are stored in elevated tanks, prior to being pumped to reactor. Since this creates a positive pressure head against pumps, provisions had to be made to eliminate any possibility of unwanted flow through pumps when they were not running.

Solution: To maintain accurate, repeatable control of process, American Cyanamid engineers specified automatic air-operated control valves (series LB) on lines handling reactants, temperature controlling heat-exchanger brine and other services. Valves are single-seated, split-body, units with pneumatic cylinder actuators. Split-body design provides throttling control without cavitation or build-up of solids and assures tight shut off.

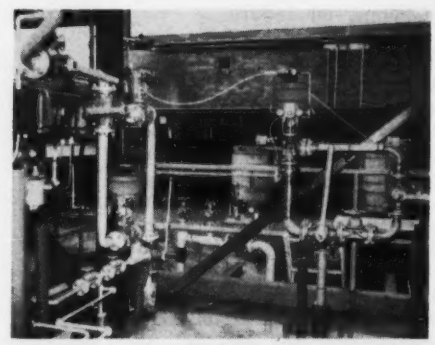
Actuators have high-polished aluminum piston and cylinder castings with no flange seams. Synthetic-rubber lipseals assure air-tight operation. Integral positioner is completely enclosed, with no exposed moving parts. Zero adjustment can be made while unit is in operation.

Signal for flow and temperature control action is provided by pneumatic recorder-controllers. Differential pressure impulse, for flow rate, or pneumatic temperature signal are transmitted to controller. Correcting signal to reposition valve is generated with any deviation from set-point.

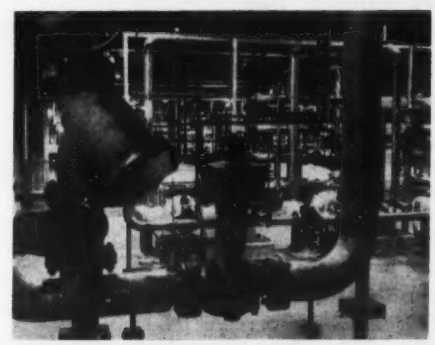
Control valves on reactor feed lines are ¾ and one inch; for brine lines control-

[1]W. Mayo Smith "Vinyl Resins", Reinhold Publishing Co. 1958, pp 53, 54

*Creslan is American Cyanamid Company's trademark for acrylic fiber. Use of trademark is authorized by company under trademark and quality control program. Cyanamid generally manufactures and sells its product as Cyanamid acrylic fiber, and use of Creslan trademark is authorized only in connection with finished fabrics and knit products which meet performance and quality standards established by the company.



Polymer slurry flow is controlled with dependable accuracy by air-operated units



Split-body design of control valve on six-inch brine line provides throttling control without cavitation or solids build up

ling temperature of solvent bath, valves are six inches. All piping is 316 stainless.

An interesting aid to smooth flow control is circular piping arrangement. Many pumps run continuously to maintain circulation, even when there is no demand, by means of a by-pass system with automatic back-pressure control on pumps. Valves regulate flow into system, as needed. This practice provides more accurate control and ends surge due to starting and stopping of pumps.

To prevent flow through feed lines when pumps are shut down, control valves (Saunders Patent) were installed on suction side of all feed pumps. Double-action, diaphragm actuator on these units permits full use of air pressure in both directions of stem travel. They are coupled with pump electrical control so that they open when pump is operating and seal immediately when pump is turned off. An Airlock auxiliary feature provides positive valve closure in event of supply-air failure.

Average air pressure in Santa Rosa plant is 90 psi. Valves are designed to take advantage of full plant air supply when extra speed and power for tough throttling control are necessary.

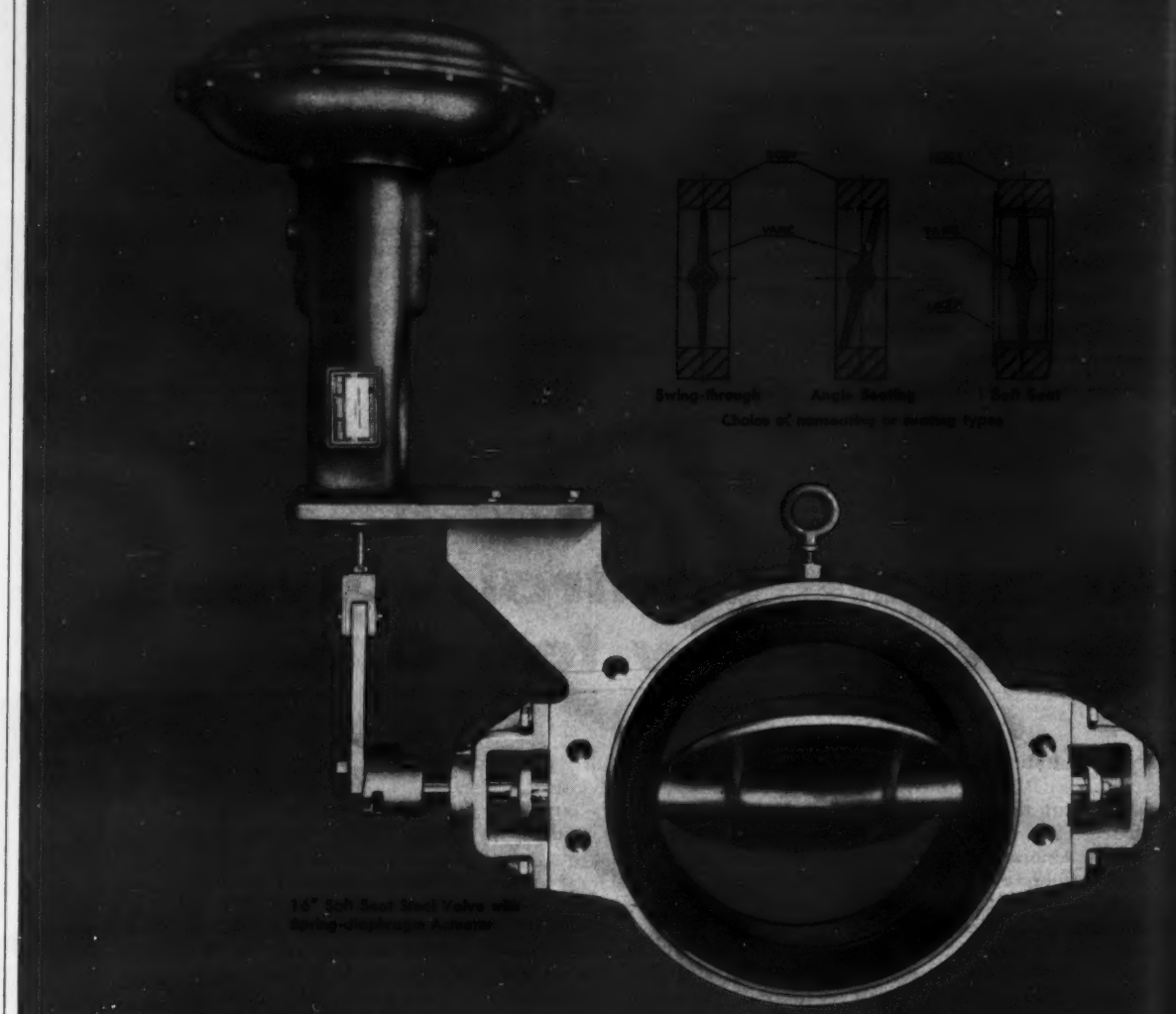
Results: Dependable, accurate and repeatable action of control valves permits continuous operation within tight limits of process conditions. Actuating cylinders have no diaphragms to rupture, so failures are virtually eliminated. Since no moving parts are exposed, they are not subject to corrosion.

In temperature control function, sensitive positioning relay on units provides fast response to instrument signal changes as low as 0.2 inches of water. Stroking speed is two to five seconds, providing essential plus-or-minus two-degree temperature control of solvent bath.

(Saunders Patent and Series LB control valves are products of Conoflow Corp., 2100 Arch St., Philadelphia, Pa.)

Check 3884 opposite last page.

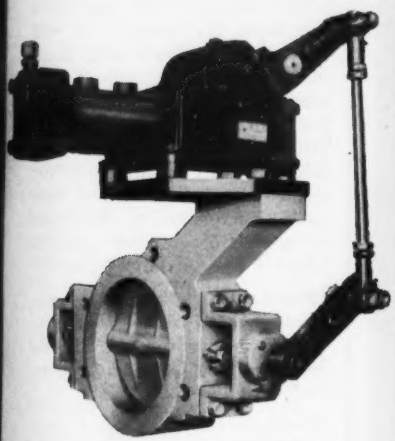
from Mason-Neilan...



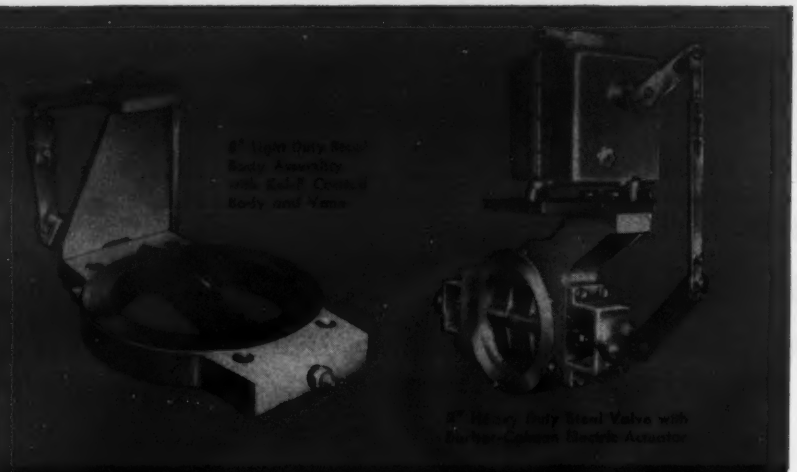
Flexibility in Butterfly Valve Application

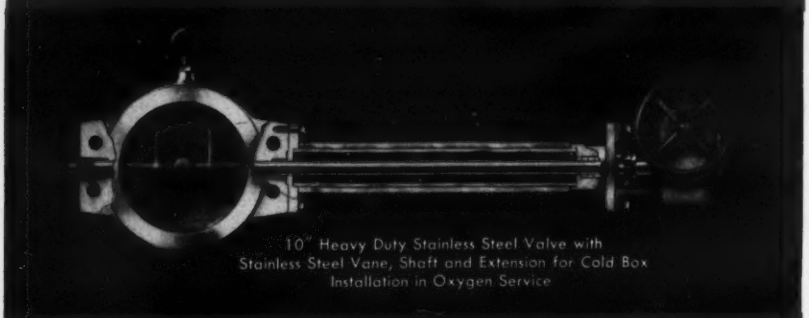
With Wide Selection of Actuators, Choice of Swing-through or Seating Types

10" x 10" x 6" Heavy Duty Tee Valve with Spring-diaphragm Actuator and Side-mounted Auxiliary Handwheel

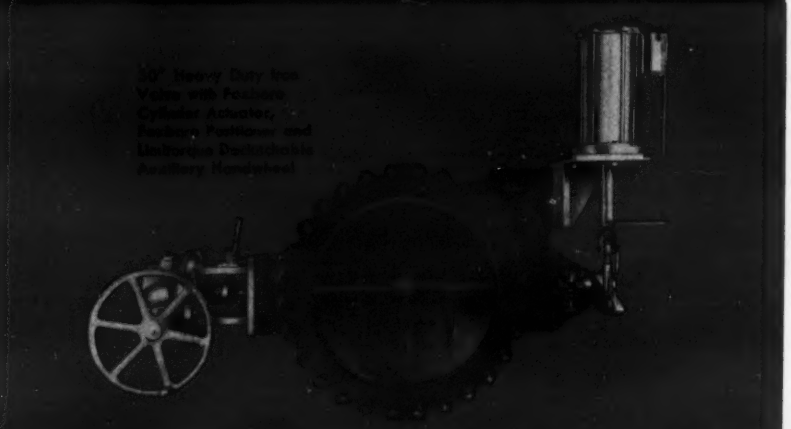


8" Heavy Duty Steel Valve with G.P.E. Crank Type Cylinder Actuator





10" Heavy Duty Stainless Steel Valve with Stainless Steel Vane, Shaft and Extension for Cold Box Installation in Oxygen Service



Mason-Neilan offers a broad line of butterfly valves with a choice of nonseating, angle seating, or soft seat wafer bodies and a wide variety of power and manual actuators.

The few typical examples shown here are indicative of the scope of the Masoneilan line. These, and the many other variations available, exemplify the quality and design features resulting from over 75 years of experience in valve manufacturing.

For control of large volumes of liquids or gases, select Masoneilan Butterfly Valves. Complete information on request, ask a Mason-Neilan representative or write to:

MASON-NEILAN

Division of Worthington Corporation

25 NAHATAN STREET, NORWOOD, MASS., U. S. A.

Sales Offices or Distributors in Principal Cities in United States and Abroad

In Canada: Worthington (Canada) Ltd., Mason-Neilan Division

MASONEILAN

MNO-58

Check 3885 opposite last page.

Measures liquid levels at temperatures below freezing

Uses: Gaging liquid level in water or freezable aqueous solution tanks under freezing conditions.

Features: Switch housing of vapor-proof construction; can be completely immersed in water or in humid atmosphere. Heat from tube housing float is sufficient to keep region fluid.

Description: Aluminum tube houses float. 100 watt immersion heater in tube is cut "on" by thermoswitch when tube temperature drops to 35°F. 24 watt resistance heater keeps switch housing warm, is also turned on by thermoswitch. Mercury switch actuated by float closes and opens pump control circuit. Constant 36" differential is standard but can be shortened in 6" increments between 36" maximum and 6" minimum.

(Model A-101 liquid level control is product of Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.)

Check 3886 opposite last page.

Vacuum electronically to 1 x 10^{-9} mm Hg

Uses: General laboratory, vacuum tube processing, thin-film deposition studies.

Features: Compact, efficient. Weight 13 lb. All-metal coupling with rotatable flanges permit any desired orientation. Pumps draw current in linear relation to pressure; permitting pump to serve as vacuum gage.

Description: Based on cold-cathode pumping structures. Contains replaceable multi-filament evaporator, permitting injection of additional titanium. Rough vacuum of 15 to 20 microns is required for starting. Approximately 6¼ x 7¾ x 5".

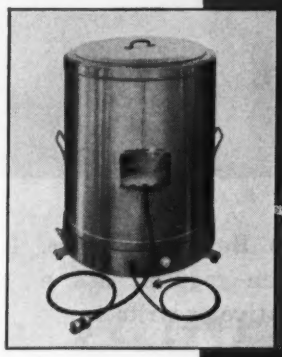
(Series 150 UlteVac electronic high-vacuum pumps are product of Ultek Corp., 920 Commercial St., Palo Alto, California.)

Check 3887 opposite last page.

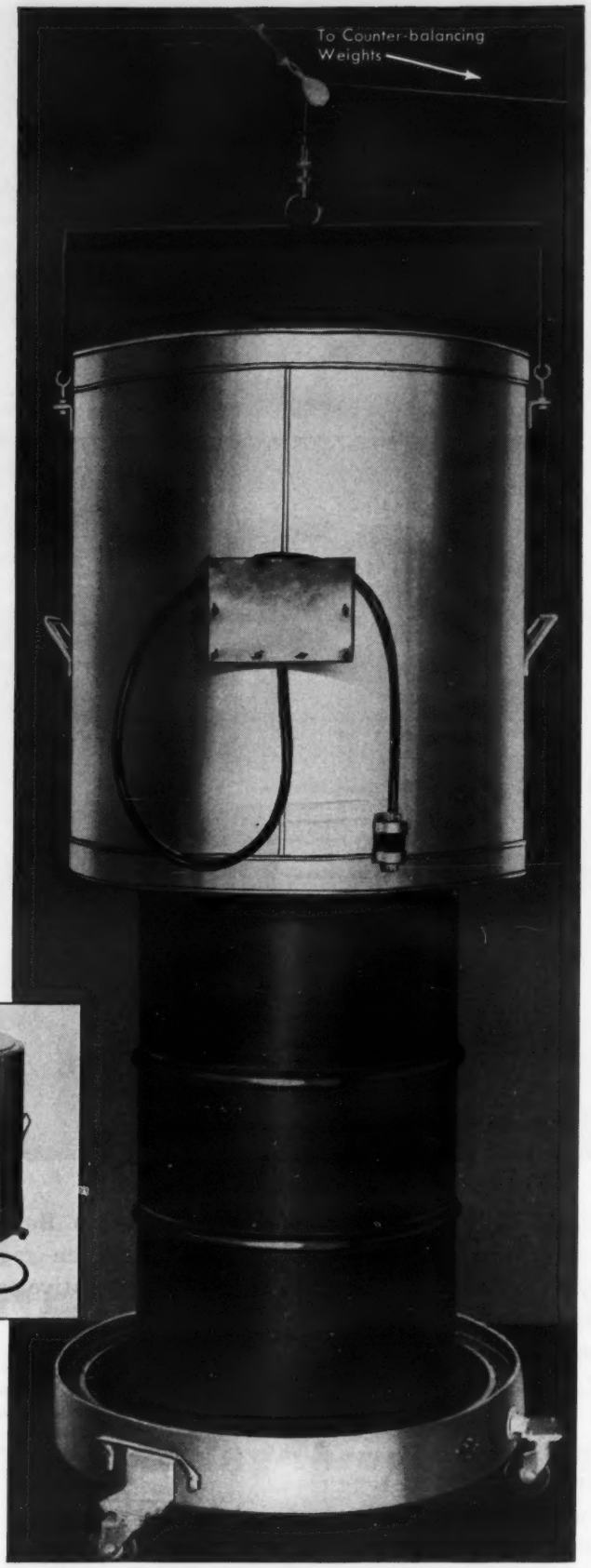
FOR CONTROLLED HEATING of tars, asphalts, heavy oils, greases, paints, varnishes, pitches, resins, plastics, shortening, gelatinous materials

Now! . . the Glas-Col Complete Drum Heater is designed for lifting or lowering by pulleys and counter-balancing weights. One man can easily handle it with one hand! To use, simply place drum on the heater base. Then lower cylindrical part of heater down over the drum. Hook up the two leads. The drum is completely enclosed by the cover, cylindrical and base unit.

Heating elements, embedded in rugged fabric, are close together. This insures uniform input..no local overheating. Accurately controlled temperatures to 550° F can be obtained in base and cylindrical part of the heater by means of separate thermostats. Rugged casters make loaded unit easy to move. The Glas-Col Drum Heater weighs only 95 pounds . . if desired, two men can easily handle it without pulleys and counterweights.



Base part of heater (1800 w, 230 v), **$200.00** . . cylindrical part (6000 w, 230 v), **$340.00** f.o.b., Terre Haute, Indiana. (When ordering, please specify outer diameter of drum chimes. Base or cylindrical unit can be ordered separately.)



Glas-Col Apparatus Company

Dept. CP, 711 Hulman Street
Terre Haute, Indiana

Ask for 4-page descriptive Bulletin DH-100

Check 3888 opposite last page.

INSTRUMENTS & LAB

Pneumatically signals fluid rates of flow to remote recorders

Magnet design provides evenly-distributed field

Uses: Rotameter measures fluid flow rates; attached transmitter pneumatically signals rates of flow to remotely located recorders.

Features: Ease of calibration — four adjustments permit accurate field recalibration. No cams used. Magnet design provides evenly-distributed field without drag on metering float. Varying air pressure (20-25 psi) does not affect accuracy.

Description: Metering float of rotameter has extension rod which extends into transmitter case. As magnet in rod moves up or down with float, movement is followed by magnets encased in arm of transmitter. Arm operates ball pilot in transmitter unit. This pilot controls air pressure for accurate transmission of flow rates. Factor tag on dial face is used to convert percent scale units to flow quantity.

(Pneumatic transmitting rotameter with Model 58 transmitter is product of Schutte and Koerting Company, Cornwells Heights, Pa.)

Check 3889 opposite last page.

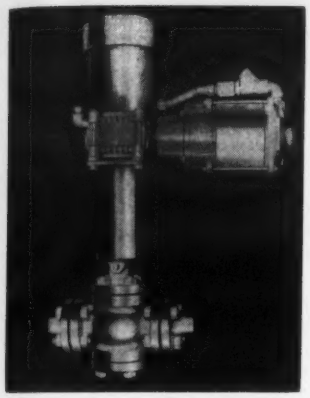
Electronic process control valve operator uses electronic switches

Stroking speeds up to 1/3" per second

Uses: Said to be adaptable to all electronic process controllers.

Features: Employs neither hydraulic nor pneumatic elements. Motor starting, stopping, and reversing control are completely electronic operations. There are no mechanical switches or relays. Frequency response and transfer characteristics are said to be equal to those of pneumatic operators, as are torque and thrust.

Description: Motor control circuitry is in "printed circuit" construction. Motor con-

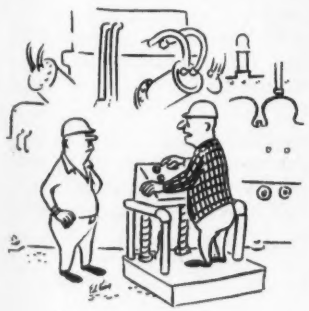


Electric motor control valve operator uses completely electronic switching

trol auxiliaries are available in vacuum tube and solid state circuitry. Stroke lengths and speeds are said to be available to meet all valve sizes and process requirements. Operator is adaptable to plug, butterfly, or standard gate valves in addition to conventional control valves. Uses standard AC supply voltages. Maximum of seven wires required to connect motor to control center. There is said to be no susceptibility to noise disturbances in these leads.

(Process control valve operator is a product of Industrial Process Engineers, Inc., Newark, N.J.)

Check 3890 opposite last page.



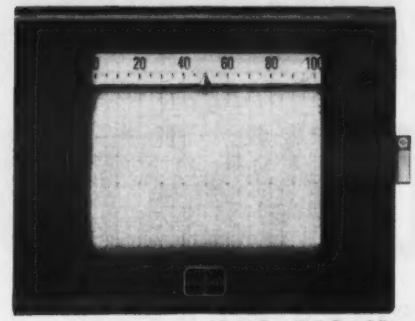
"Grandad taught Daddy a trade and he taught me one, but all I can teach my kid is how to push a button."

World's first mobile, self-contained nuclear power plant and first U. S. gas-cooled reactor for generating power—these are the dual aims of the Gas-Cooled Reactor Experiment Program (GCRE-I), being carried out at the National Reactor Testing Station, Idaho, for the U. S. Army and U. S. Atomic Energy Commission by Aerojet-General Nucleonics.

We're proud that Aerojet-General, prime contractors for the Army Gas-Cooled Reactor Systems Program and builders of both the reactor and its control system, selected Bristol Dynamaster* potentiometer and bridge instruments to record vital reactor data.

Bristol offers control-systems builders—whether for the nuclear or any other industry—the widest instrument choice on the market for measurement, recording, automatic control, and telemetering. Electronic and pneumatic types. Full-size and miniature (3" strip chart) types. For complete data, write: The Bristol Company, 141 Bristol Road, Waterbury 20, Conn. 9.25

Bristol Dynamaster* Electronic Potentiometer or Bridge Instrument, strip-chart model.



**T. M. Reg. U. S. Pat. Off.*

BRISTOL

INSTRUMENTS *record*

Army reactor's progress

Control Room for GCRE-I Gas-Cooled Reactor Experiment. Bristol Dynamaster instruments are at top of "stand-up" panel at rear. Photo courtesy of Aerojet-General Nucleonics, San Ramon, Calif.

BRISTOL... for improved production through measurement and control

AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

Check 3891 opposite last page.

APPLETON V-51 SERIES CONVERTIBLE VAPORTIGHT FIXTURES

Require only seconds

to relamp or convert!

One trip up the ladder, a few quick twists of the wrist, and relamping or wattage conversion is done! V-51 reflectors with integral neoprene ring adapt perfectly to the grooved unilet . . . permit instantaneous substitution of reflectors.

Malleable Iron Unilet
Takes either 100 W or 150-200 W adapters. Ceiling, pendent, or bracket types available in a variety of hub sizes.
Reflector
Steel, with green porcelain enamel exterior; sized for 100 W, 150 W, or 200 W lamps. Snaps easily into position.
Unit Assembly . . .
Adapter, Globe, and Guard
100 W and 150-200 W size globe adapter with shock absorbing socket. Die cast aluminum guard has two sealed stainless steel ball plungers which snap securely into cavities in adapter. Vaportight globe in 100 W or 150-200 W sizes in clear glass or various colors.

U. S. Pat. 2,749,433
2,749,435 2,715,214
Canada Pat. 531,655
511,696

Maintenance man takes spare assembly to lamp requiring replacement or wattage change . . . removes lamp assembly . . . screws fresh unit in place and the job is done! Higher wattages of 150/200 are interchangeable with 100 watt unit and can be used in same unilet body. (Die-cast aluminum guard turns counter clockwise to act as a tool for easy removal in relamping).

An upward thrust and slight quarter twist engages neoprene ring with the groove in the unilet and snaps the reflector in position. Entire operation of removing lamp, inserting new unilet, and positioning of reflector requires no special tools . . . no set screws . . . no small parts to juggle. Absolute simplicity!

For economical service and maintenance, it's hard to find anything more practical than Appleton's V-51 Series exclusive unit assembly (adapter, receptacle, globe, and guard). Shock absorbing socket cuts lamp replacement costs. Try the Appleton V-51 Series standard or shallow dome, deep bowl, or angle type reflectors and 100 W and 150/200 W vaportight unit assemblies in your plant today. Available in a variety of hub sizes in pendent, ceiling, or bracket type fixtures for every kind of installation.

Sold Through Franchised Distributors Only

APPLETON ELECTRIC PRODUCTS

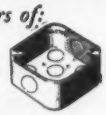
Rely on **APPLETON** *. . . the Standard for Better Wiring®*

APPLETON ELECTRIC COMPANY

1704 Wellington Avenue • Chicago 13, Illinois

Also Manufacturers of:

"ST" Series Connectors


Outlet Boxes

Explosion-Proof Fixtures

Malleable Iron Unilets & Covers

Automatic Reelites

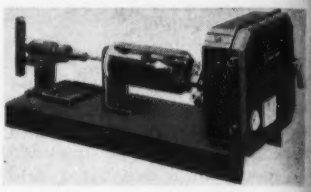
Check 3892 opposite last page.

Metering pump output linearly proportional to air pressure

Pneumatic oscillator controls power piston

Uses: Simple metering, flow ratio control, process variable control, and multiple proportioning.

Features: Unit is explosion-proof. Operating power can be air or gas. Metering adjustments can be made during operation. Absence of bearings and linkages, use of dual



Remotely controllable timer controls stroke frequency

check valves, assure stability of setting. Cylinder piston and pump plunger positioning accuracy is said to be within 0.002 inch, repeatedly.

Description: Positive-displacement pump plunger is direct connected to and operated by pressure-loaded pneumatically powered piston, action of which is controlled by a pneumatic oscillator. In multiple proportioning, one oscillator is used with several servo-positioners. Oscillator can be adjusted remotely from one stroke cycle per three minutes to 60 per minute. Delivery capacities range from 0.12 to 82.5 gal per hr, with discharge pressures to 5000 psig. Actuating air pressure is 80 psi, or may be lower.

(Servo-Gauge Metering Pump is a product of Associated Control Equipment, Inc., P.O. Box 136, Coraopolis, Pa.)

Check 3893 opposite last page.

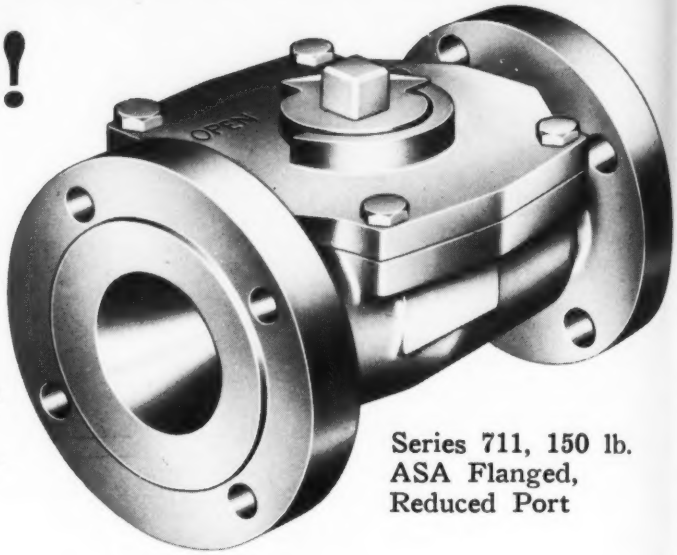
For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

totally
new!

Only *FLO·BALL* valves are bearing-fixed for maintenance-free long life!

. . . with all the features you must have:

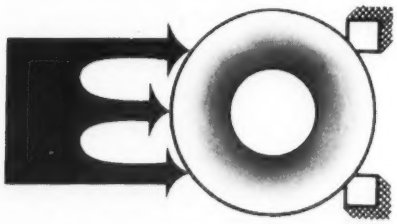
- **Top loading**
- **Replaceable seats**
- **One-piece ball and stem**
- **90° on-off**
- **Two-way flow**



Series 711, 150 lb. ASA Flanged, Reduced Port

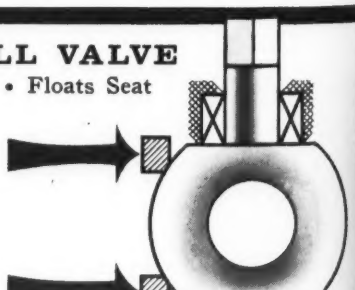
Now available . . . the result of years of intensive service in the missile-space industry . . . proven in thousands of adverse applications . . . now at mass produced prices . . . the most advanced line of ball valves ever manufactured . . . for you!

ORDINARY BALL VALVE
Floats Ball • Fixes Seat



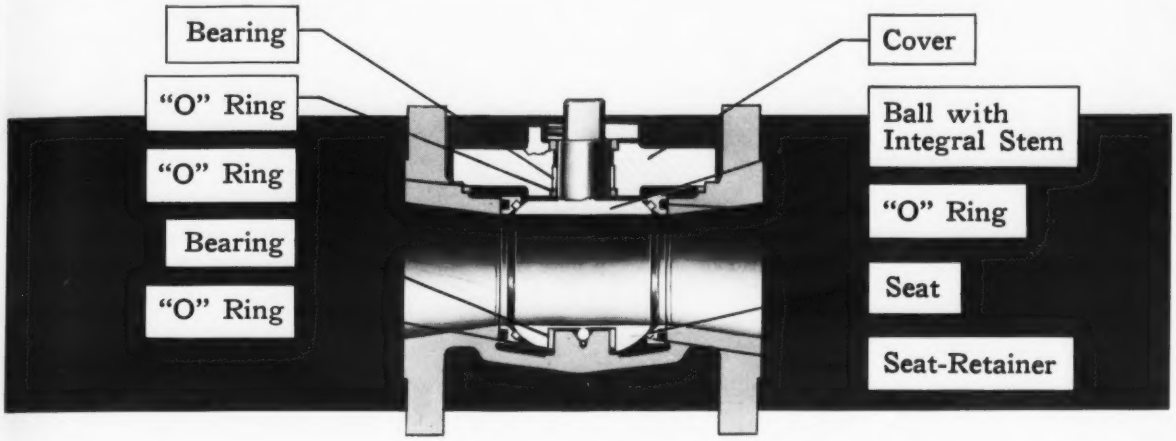
Floating ball puts excessive pressure load on fixed seats. Results in distortion and short life.

FLO • BALL VALVE
Fixes Ball • Floats Seat



FLO·BALL bearings absorb all pressure forces. Elimination of excessive seat loading insures long life.

The Series 711 ***FLO·BALL*** valves are available for off-the-shelf delivery. All are manufactured to standard ASA dimensions in semi-steel, carbon steel, 316 stainless steel, and aluminum (ASTM 356-T-6) for body and ball, Teflon for seats, and Buna "N" O-Ring seals. Other materials are also available. These valves operate at pressures to 300 psi, temperatures to 400° F.



The Hydromatics Series 711 FLO•BALL valve gives you the features you must have!

- Bearing-Fixed ball. Engineered to withstand shock and impact without distortion or backlash.
- Top loading. Valve can be disassembled and assembled without removing it from line. No special tools are required.
- Self adjusting, replaceable seats. Both balanced seats are self-aligning and self-adjusting for controlled seat loading and positive seal.
- No lubrication. Operates completely without lubrication.
- Zero leakage. At all operating pressures, including vacuum to 10^{-6} mm. of Hg.
- One-piece stem and ball. Simplified construction adds strength, precision and lower torque.
- Maximum flow efficiency. The open ***FLO·BALL*** valve provides an unrestricted, straight-thru fluid path.
- Lowest torque. Bearing-Fixed construction results in effortless, fast-action with low torque.
- Two-way flow. Exclusive ***FLO·BALL*** seat design principle insures perfect seal in both directions.

Hydromatics, Inc.

FLO· BALL

Mail this postage-free card today

Tear Along This Edge

Gentlemen:
Your Bearing Fixed Flo•Ball valves from ⅛" to 24" may help solve a problem relating to the control of:

☐ Corrosive Liquids ☐ Cryogenic Liquids ☐ Throttling Flow
☐ Vacuum ☐ High Pressure

My flow problem is_____

PLEASE: ☐ Have salesman call ☐ Send technical data

My name_____ Position_____
Company name_____
Address_____
City_____ State_____

Hydromatics, Inc.

LIVINGSTON, N. J. • WYMAN 2-4900 • TWX = LIVINGSTON, N. J. 120

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Livingston, New Jersey

FIRST CLASS
PERMIT #40
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NEW JERSEY

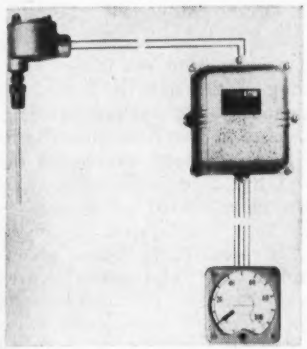
Mail this postage-free card today

Measures tank or bin level of anything

Uses: Unit detects, measures, and visually indicates media level changes. May be used with nearly all liquids, slurries, powders and granular solids.

Features: Contains no moving parts to clog, wear or jam. System features self-cleaning Teflon probe assemblies claimed to remain free of deposit build-up and to be unaffected by adhesive substances.

Description: System consists of probe, detector, transmitter and indicator. Employs a miniature capacitance bridge circuit housed in probe condulet, enabling remote transmitter location. System checkout and calibration accomplished by depressing test circuit button on control panel indicator. Printed circuit wiring and plug-in provision for critical components are said to assure minimum maintenance.

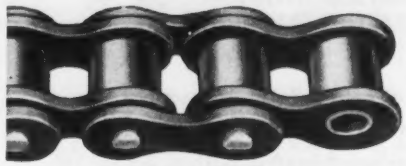


Teflon probe resists adhesives and deposits

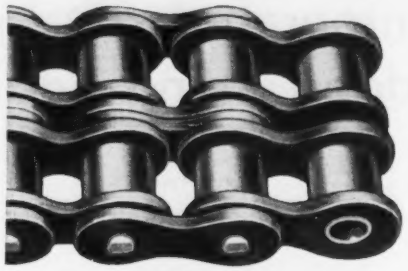
(Level-Tel 154 capacitance level gage is a product of Robertshaw-Fulton Controls Company, Aeronautical and Instrument Division, Santa Ana Freeway at Euclid Ave., Anaheim, Calif.)

Check 3894 opposite last page.

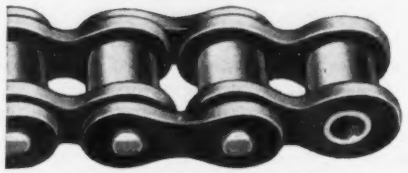
For more information on product at left, specify 3895 . . . see information request blank opposite last page.



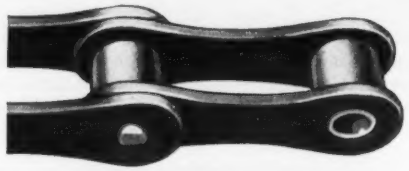
SINGLE STRAND



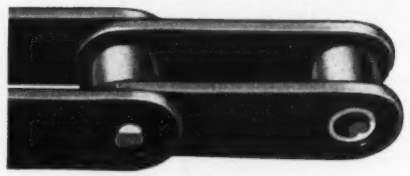
DOUBLE STRAND



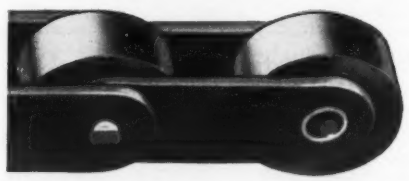
SINGLE STRAND, HEAVY SERIES



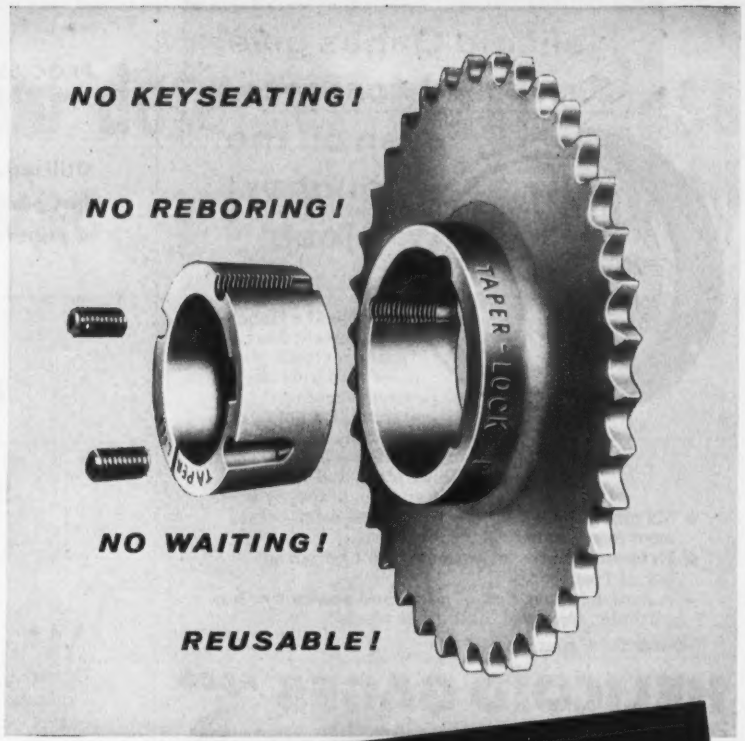
DOUBLE PITCH TRANSMISSION



DOUBLE PITCH CONVEYOR



DOUBLE PITCH CONVEYOR, LARGE ROLLERS



TAPER-LOCK SPROCKETS
DODGE ROLLER CHAIN

DODGE Quality Roller Chain, teamed with Dodge Taper-Lock Sprockets, results in chain drives and chain conveyors that have the precision, efficiency and stamina necessary for the real economy of *long life*.

Moreover, Taper-Lock's reusable bushing makes a difference in overall cost. The ease of Taper-Lock mounting, the elimination of reboring, keyseating, and wasted time, add to the saving. Precision machining and true articulation lengthen the life of *both* sprocket and chain.

The Dodge line of chain, including standard attachments, is extensive. It meets a high percentage of all chain requirements.

In the Double Pitch series (both Transmission and Conveyor) the sizes which require special spacing for perfect tooth action are offered from stock in special double pitch design — to double the life of the chain and the sprocket!

Ask your local Dodge Distributor. Or write us for bulletin.

DODGE MANUFACTURING CORPORATION, 6200 Union St., Mishawaka, Ind.

CALL THE TRANSMISSIONEER—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Machinery."

DODGE
of Mishawaka, Ind.

Check 3896 opposite last page.

Helicoid Gages give
Sustained Accuracy,
even on the
toughest
jobs

★ Exclusive Helicoid movement has no gears, no teeth. Shock-proof construction protects accuracy through millions of cycles.

★ Bourdon tubes available in four materials—bronze, steel, stainless steel, and K Monel—won't stretch, crack, or leak.

★ Six cases, including new solid-front safety case, meet every mounting requirement.

★ External pointer adjustment can't be jarred out of position.

★ A complete selection of gages and accessories for hydraulic, chemical, and other service.

Write for Catalog DH-65.

HELICOID GAGES

Helicoid Gage Division
American Chain & Cable Company, Inc.
929-P Connecticut Avenue • Bridgeport 2, Conn.

Check 3897 opposite last page.

- *ELECTRONIC LIQUID LEVEL*
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Check 3898 opposite last page.

PROCESS INSTRUMENTATION and LABORATORY APPARATUS

Utilization of rental Teletype system has permitted National Lead Co. to devise a plan for process control with . . .

Integrated data processing added at no additional cost

R. F. STEVENS and **W. W. GAUS**
National Lead Co., Titanium Div.
St. Louis, Mo.

Manufacture of titanium pigments at the St. Louis Plant of the Titanium Division, National Lead Company, is an exacting process which involves almost every unit operation. Operations are closely controlled with a sampling system which covers each stage from raw materials to finished products.

Some time ago it became apparent that both immediate and long-term use of control information could be improved. Daily communication of more than 2500 laboratory results to plant operating centers was burdensome. Processing of the results for evaluation and reporting required an increasing amount of time and effort. Analysis of these problems led to the idea of coordinating the transmission and recording of the data in a common language form suited to machine handling.

The best solution was determined to be teletypewriter equipment which has the suitability of the tape perforating typewriter with many added advantages — particularly that the system could be supplied on a rental basis. Other advantages included: (1) equipment proven over several decades; (2) transmission over regular telephone wires (with wires available in the network installed in the plant for regular telephone service); (3) maintenance and service provided on a 24-hour per day basis; and (4) reasonably low initial installation charges.

Equipment consisted of a transmitter, tape perforator, and five receivers. Transmitter was placed in the control laboratory, and the receivers in the main operating centers in locations chosen by the production department. A pushbutton dialing device was obtained. It is possible to send messages at the same time to any or all receivers.

SAMPLE ANALYSIS CARD

CODE	1	2	3	4	5	6	7	8	9	10
ORE FINENESS	UNIT 1	UNIT 2	UNIT 3	UNIT 4	TIME					
1-110	—·—	—·—	—·—	—·—	----					
DIGESTION	BATCH	TK	ANAL A	ANAL B	ANAL C	ANAL D	ANAL E			
1-120	----	--	-·---	--·-	---	----	·--			
STATION 1								ANALYST ——		

FIGURE 1

PROCESS DATA
DAILY AVERAGES
09 23 1959

ORE FINENESS	UNIT NO 1	X.XXX
	UNIT NO 2	X.XXX
	UNIT NO 3	X.XXX
	UNIT NO 4	X.XXX
DIGESTION	ANALYSIS A	X.XXX
	ANALYSIS B	XX.XX
	ANALYSIS C	XXX.X
	ANALYSIS D	XXXX.
	ANALYSIS E	.XXXX
SOLUTION	ANALYSIS A	XX.XX

FIGURE 2

PRODUCT DATA
WEEKLY SUMMARY
09 23 1959

PIGMENT Z	PROPERTY A	AVG	XX.XX
	PERCENT IN	RANGE 1	XX.XX
		RANGE 2	XX.XX
PIGMENT Z	PROPERTY B	AVG	XXX.X
	PERCENT IN	RANGE 1	XX.XX
		RANGE 2	XX.XX
		RANGE 3	XX.XX
PIGMENT Z	PROPERTY C	AVG	X.XXX

FIGURE 3

A system was designed for reporting the results for a single sample on a single teletypewriter line which was separated into twelve columns: the first for the time of transmission, the second for the sample identification code, and the remaining ten columns for analyses and other descriptive matter such as tank number or batch referring to the sample. To assure that the results for each sample be recorded in the correct field, a sample analysis card (Figure 1) was prepared for each type of sample, carrying analysis data in exactly the same format as recorded and transmitted by teletypewriter.

Four Digit Code

Sample identification code consists of a first digit which represents the pigment system and three other digits which describe the sample. The sample digits were segregated into blocks of 100, each representing a major process in pigment manufacture, for example: digestion of ore, clarification of titanium solution, precipitation, calcination.

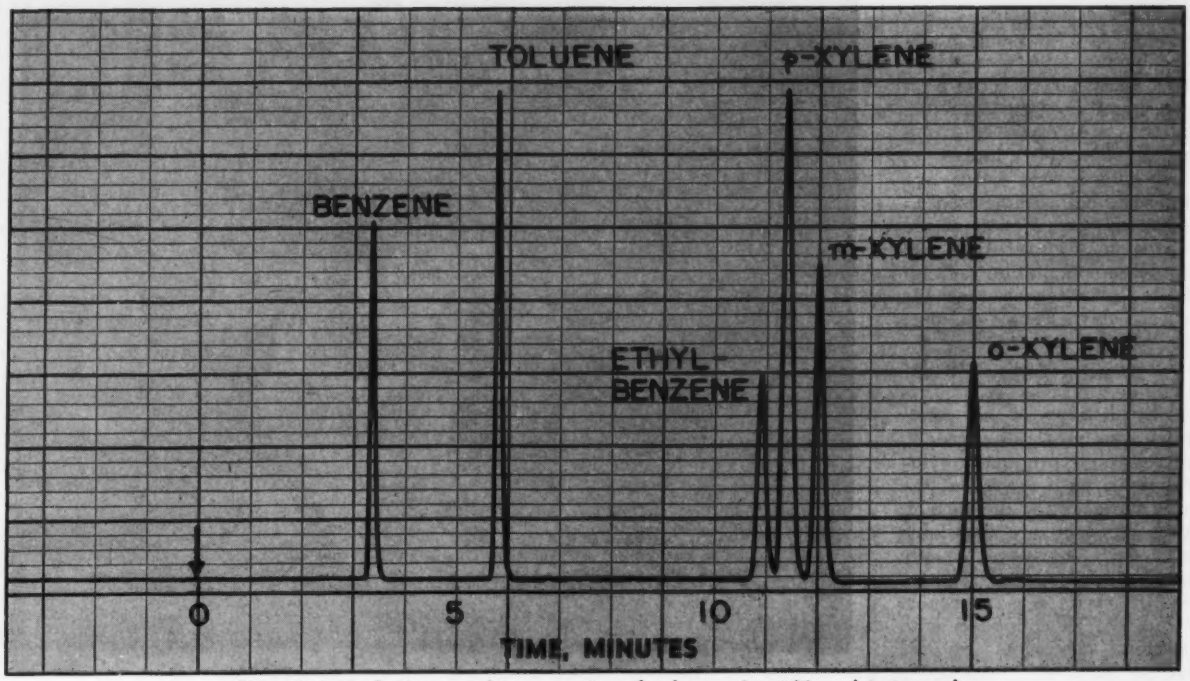
Arrangement of results for each sample within the 10 fields was made in two basic ways. In **first** arrangement, results were placed in a logical sequence with batch number or time followed by tank and then the various analyses. In **second**, for pieces of process equipment more or less in parallel operation the results from unit 1 were placed in field 1 and unit 2 in field 2, etc.

Process Data Reduction

To provide data reduction, a paper tape is prepared by the perforator simultaneously with transmission of the laboratory results to the plant. Tape is perforated with the five channel (five positions across the tape which can either be perforated or not to give 32 combinations) teletypewriter code for each key stroke of the transmission. In-

***Another* Wheelco *first*—**

New tritium detector means less base line noise, greater sensitivity



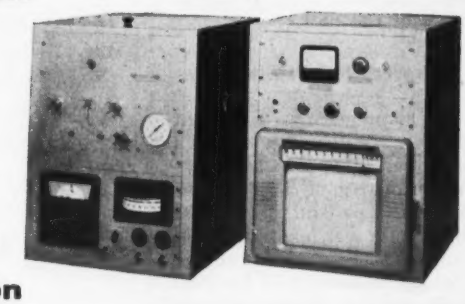
Chromatogram showing complete separation of xylenes using tritium detector and 60-ft stainless steel capillary column. Temperature, 67°C; flow rate, 0.7 ml/min Argon.

Now Wheelco offers a new tritium detector — to 225°C — in addition to the time-proved ionization detectors using strontium 90 and radium. Sensitivity is greater because tritium detectors have less base line noise than any other radioactive source: 1/3 as noisy as strontium and 1/30 as noisy as radium.

With a tritium source the detector offers the ultimate in simplicity and can be cleaned regularly. Long life with practically no maintenance or replacement is assured.

Outstanding operating flexibility is provided because the same detector can be used for capillary or packed columns.

See Wheelco first before selecting any chromatography equipment. New developments based on extensive field experience keep Wheelco ahead of the rest.



Model 20 is a compact, portable unit designed to use both capillary and packed columns. Wheelco also builds the Model 10, a laboratory unit for single or dual operation.

THE MARK OF QUALITY
BARBER COLMAN

Wheelco Instruments Division
BARBER-COLMAN COMPANY
Dept. C, 1520 Rock Street, Rockford, Illinois, U.S.A.

Check 3899 opposite last page.

formation on the tape is converted into punch card form.

A card is made for each teletypewriter line. Punch is also set to identify error cards and other results which should be excluded as designated on the teletypewriter copy, to duplicate information from error cards where required, and to gang punch the calendar date from a lead card. Cards representing a day's operation (approximately 750) are prepared from tape in about 60 minutes.

Laboratory data cards are tabulated and summarized in the punch card section of the accounting department. A complete compilation of all results by category is made for each day (Figure 2), plus the average for the day for each analysis of a particular sample.

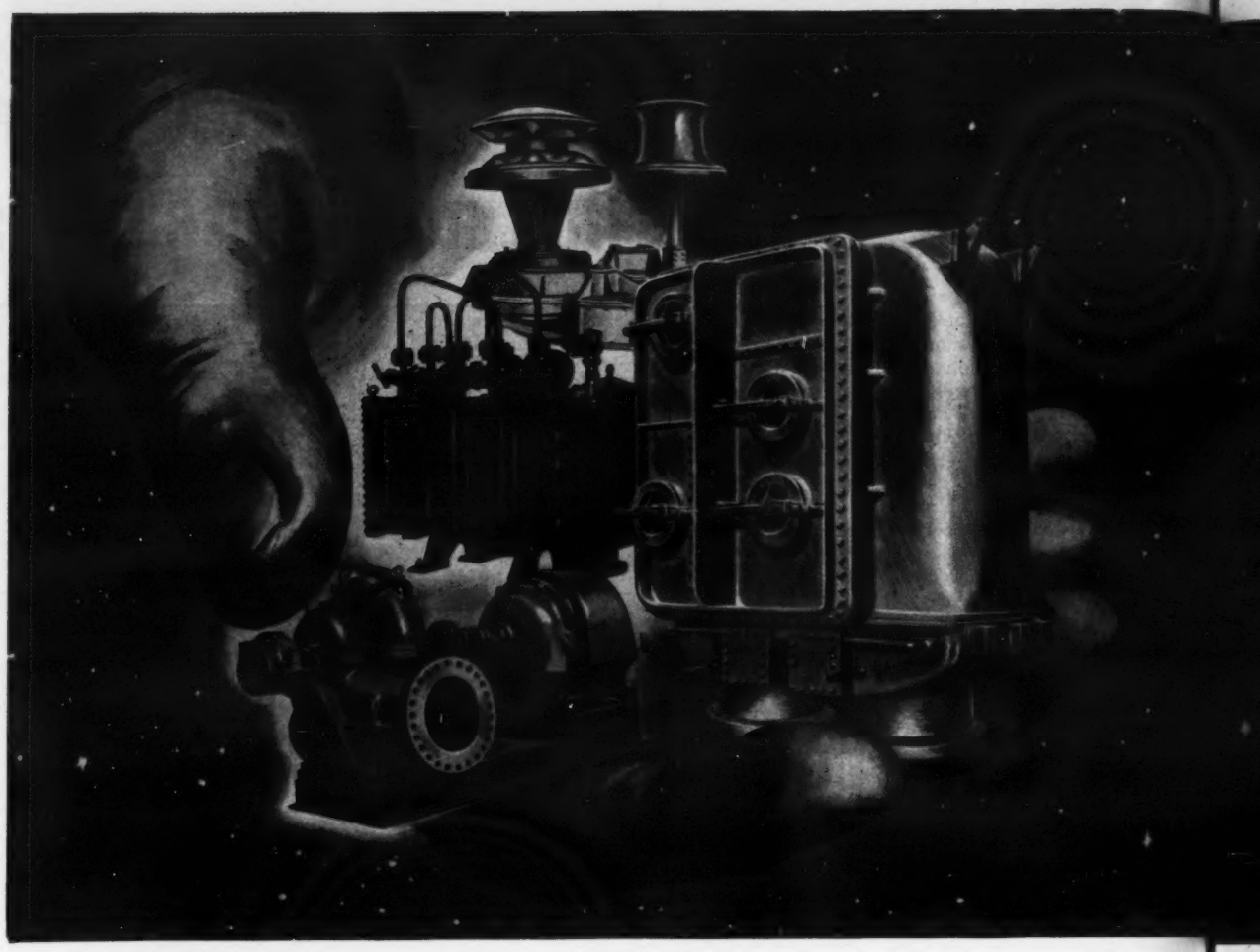
Daily listings of all laboratory analyses are sent to process and production departments, with a copy of the daily averages for the former. These reports are available early each morning. Weekly and monthly averages reports are prepared. Weekly report (Figure 3) is annotated with pertinent comments by the process engineer responsible for each process area before distribution to process control, production, and management groups. Monthly results after editing are included in the process section of the plant's monthly resumé.

Finished Product Data

For finished product, lots are listed on a paper offset master by accounting machine from which are prepared copies of the daily report.

Product Data Reduction

In summarizing finished product results, the average (weighted by tonnage) for each property of a particular pigment type and percent of tonnage in various ranges of each property are determined. Tonnage is developed for each level and for ranges of each level for each property. Weighted averages for particular property and percentages in range are calculated. Week-



NEW! ...the combination of

the combination of these two equipment in designing or procuring components for

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The New Story of
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c/o C. H. Wheeler Mfg. Co.
19th St. and Lehigh Ave.
Philadelphia 32, Pa.

among the many components offered are: Condensers, Ejectors, Heat Exchangers — Bare Tube, Extended Surface Heat Exchangers,

ly product report is prepared on same paper as weekly process averages and is distributed with inserted comments. Monthly breakdown is similar; results also being reported in monthly plant resumés.

Errors Minimized

Control laboratory quickly developed an acceptable degree of precision in Teletype recording with errors reduced to a minimum. Over-all laboratory work load appears to have been lightened. From a mechanical standpoint the Teletype machines have been wholly satisfactory. Trouble calls average 3 or 4 per month with full service usually restored within 2 or 3 hours. Most breakdowns affect only a single machine in the network which does not disrupt its general effectiveness.

Advantages

From the standpoint of large out-of-pocket expenditures, major changes were elimination of a statistical clerk's position in the process department and incurrence of teletypewriter and tape-to-card punch rental. Other factors considered include reduction in time spent processing data by other clerks and engineers, and utilization of punch card machine and operator time.

An analysis in which every pertinent cost and saving was considered indicated the change-over to integrated data processing resulted in no significant change in cost. Achievement of a much more dynamic system of handling process results at approximately equal expenditure to former methods confirms the benefit of integrated data processing.

(Condensed from a paper "Integrated Data Processing in Process Control" delivered before the St. Paul National Meeting of AIChE, September 29, 1959)

(Teletype system is available from Teletype Corp., 1400 Wrightwood Ave., Chicago 14, Illinois.)

Check 3901 opposite last page.

C. H. Wheeler Mfg. Co. / Griscom-Russell Co.

lines offers important savings for management and engineering staffs engaged a variety of applications in power plants, marine, process and nuclear systems.

C. H. Wheeler Manufacturing Company, with 71 years' experience manufacturing condensers, ejectors, pumps and other components for the power, marine, process and nuclear industries, and Griscom-Russell, with 92 years' experience in the heat exchange field, are uniting to create an important pool of experience, products and services unmatched in industry today. The advantages offered by this combination are improved and increased selection, distribution and service, resulting in substantial savings for the current and potential customers of both companies.

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SUBSIDIARIES OF HAMILTON-THOMAS, INC.

Evaporators, Marine Distilling Plants, Marine Systems, Pumps, Nuclear Components, Valve Actuators, Custom Fabrication and Machining

Check 3900 opposite last page.

Generates timed pulses without moving parts

Ideal for explosive hazard areas

Uses: Speed control of diaphragm pumps, on-off control of cylinder or diaphragm operated valves, timing actuation of power cylinders, timing alternator of fluid transfer systems, control of sample extractors, time and travel control for automatic machinery. Particularly effective for explosive hazard areas, remote field locations, service requiring repeated accuracy of response.

Features: Pneumatically actuated, has no moving parts or linkages which might introduce inaccuracies in timing. Output signal is essentially a rectangular pressure wave of amplitude of any pressure in range from zero to 30 psig.

Description: Signaling impulse frequency, variable from 0.3 to 60 cycles/min, is adjustable within compact instrument case. Amplitude of output pressure can be adjusted manually at instrument or at remote control center, or automatically by a pneumatic transmitter. Actuating power is clean air or non-corrosive gas at 30 psig or as available.

(Servo-gauge oscillator is product of Associated Control Equipment, Inc., PO Box 136, Coraopolis, Pa.)

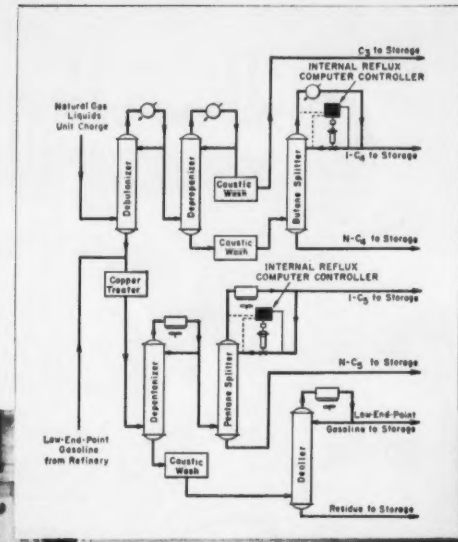
Check 3902 opposite last page.

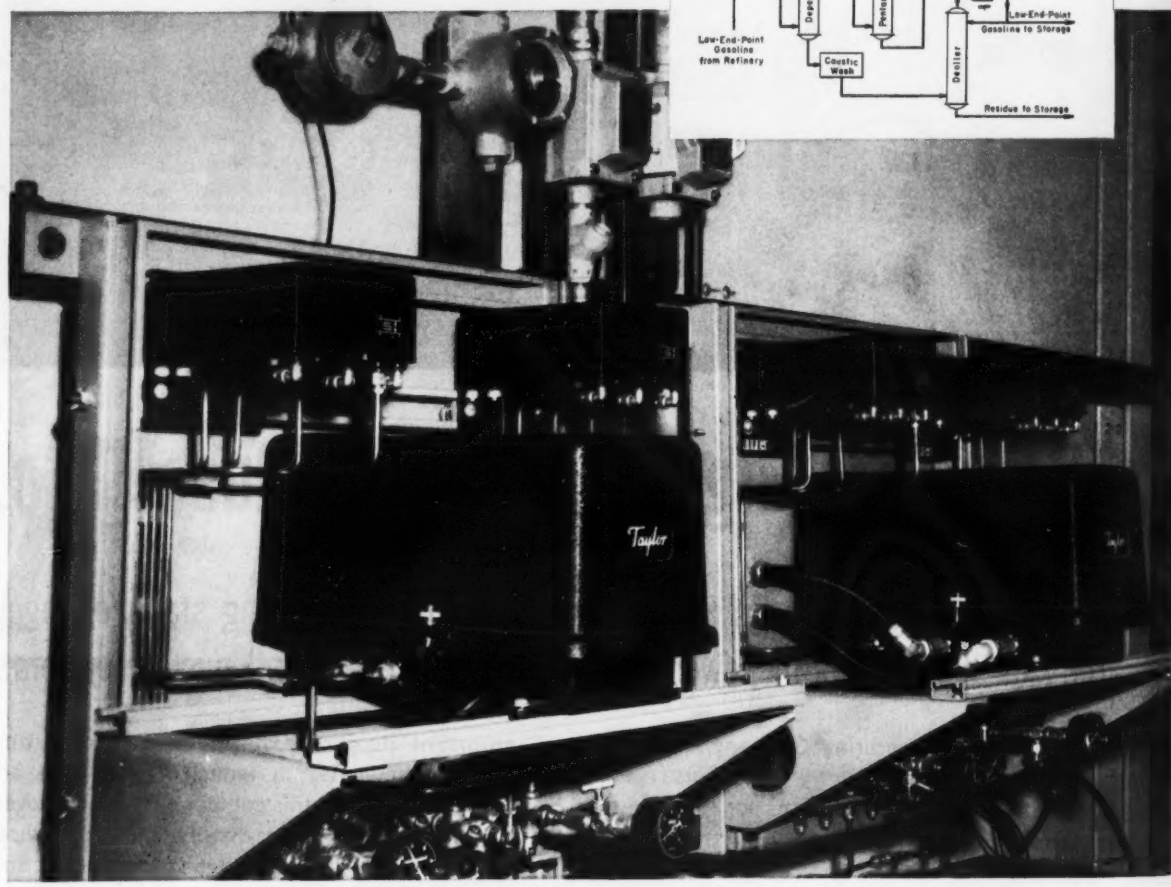
"It cuts their coffee break time in half."

MORE PROFIT PER

Drawing at right shows the Taylor Internal Reflux Computer System, installed at Phillips' Sweeny, Texas, Refinery on LP gas fractionation columns. It can be supplied with either pneumatic or electrical output. It fits into any control system already installed—also into any large scale digital or unit analytical computer installation. Set point can be adjusted manually by the operator or automatically from column temperature, process analyzers and/or computers, etc.

Components are all standard, proven units. The Taylor Potentiometer Transmitter permits the use of thermocouples in place of special resistance elements for narrow span differential temperature measurement.





Taylor Computer-Controllers in use on the light ends fractionation system, typical of several systems in use as shown in drawing above.

Taylor Instruments

BARREL OF PRODUCT...

Phillips Petroleum Co. reports optimum fractionator efficiency with Taylor Internal Reflux Computer Control

THE Taylor Internal Reflux Computer Control System consists of the addition of a simple analog computer to a fractionating column. It maintains optimum reflux flow by instantly compensating for climatic effects encountered in outdoor installations. This means:

1. Consistent product quality—no rerunning or blending.

2. Maximum utilization of existing installation.

3. Minimum consumption of steam, air and water.

4. Elimination of flooding—run to design capacity without loss of product.

5. Increased production with no process change. Adaptable to any column design and existing piping and instrumentation.

• • •

Here are Phillips Petroleum Company's answers to questions commonly asked about this system:

Are steam savings effected when using Internal Reflux Computer Controls?

"They minimize reflux adjustments necessary for day and night ambient temperature changes, thereby effecting steam savings. At the same time they contribute to the maintenance of overhead product specifications. A lower reflux ratio obviously saves steam".

Are increased product yields realized by use of computer-controls?

"While it is difficult to pin-point exact increases, we can say they permit continued tower operation at maximum load levels. Without reflux computer-controllers, column operation must be at a less efficient level to reduce hazard of flooding".

Does use of computer-controllers permit use of lower reflux-to-product ratio?

"Yes—particularly when operating to maintain product specifications, such as a minimum of 95% isopentane overhead product. Without computer-controllers it would be necessary to operate at 97% isopentane to insure a minimum 95% product".

Do computer-controllers help meet product specifications?

"Yes—they compensate and 'short-stop' transient column conditions resulting from minor temperature, pressure and feed composition changes. It is no longer necessary to have product samples analyzed in the laboratory to serve as a guide for the operator to make changes in external reflux flow rate".

Are plant operators pleased with the performance of computer-controllers?

"They are well pleased with the installations. They appreciate the smoother column operation and ease of meeting product specifications."

• • •

Ask your Taylor Field Engineer for full information about this system, developed and licensed by Phillips Petroleum Company, or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.

MEAN ACCURACY FIRST

Check 3903 opposite last page.

NEW LITERATURE

Process Instrumentation and Laboratory Apparatus

Transmitting rotameters — "position-balance" type instruments which transmit an air signal proportional to fluid rates of flow to remote-located indicators, recorders, controllers or integrators — are described with photos, sectional drawings and specifications in Bul 18N — Dept. M-Q, Instrument Division, Schutte and Koerting Company.

Check 3904 opposite last page.

Servovalve manufacturer presents tour of facilities of four plants and research laboratory with photos and descriptive text in 24-page Facilities Book — Moog Servocontrols, Inc.

Check 3905 opposite last page.

Modular recorder/reproducer for instrumentation, general-purpose instrument for industrial and scientific application, is described in 20-page booklet. Performance figures for direct, FM, pulse duration modulation and digital recording are included. FR-100B Bul — Ampex Data Products Company, Instrumentation Division, Ampex Corporation.

Check 3906 opposite last page.

Proximity switch is introduced in four-page publication which includes photographs, dimension drawings and descriptive diagrams of sensitivity range, sensitivity envelopes, mounting requirements and wiring instructions. Data Sheet 163 — Micro Switch, division of Minneapolis-Honeywell Regulator Company.

Check 3907 opposite last page.

Indicators, recorders and controllers for pH and redox are specified in two-page Data Sheet ND-46-96 (100) — Leeds & Northrup Co.

Check 3908 opposite last page.

Telemetering system for remote indication of liquid level, temperature, PD meters, pressure gage, control device indicator, and other applications is explained in illustrated Bul CP 3707 — The Vapor Recovery Systems Company.

Check 3909 opposite last page.

Bibliography containing more than 250 references to medical and biochemical applications for ultraviolet spectrophotometers is contained in Bul 762 — Beckman Scientific and Process Instruments Division of Beckman Instruments, Inc.

Check 3910 opposite last page.

jamesbury "Double-Seal" BALL VALVES

HELPING TO BUILD THE NUCLEAR NAVY

19 Nuclear Submarines in operation or under construction will carry Jamesbury "Double-Seal" Ball Valves.

The Jamesbury "Double-Seal" Ball Valve principle solved vital operational problems for our nuclear navy and is today a major factor in the building of our atomic undersea power.

Submarines Served by Jamesbury Include:

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ROBERT E. LEE	SSBN601
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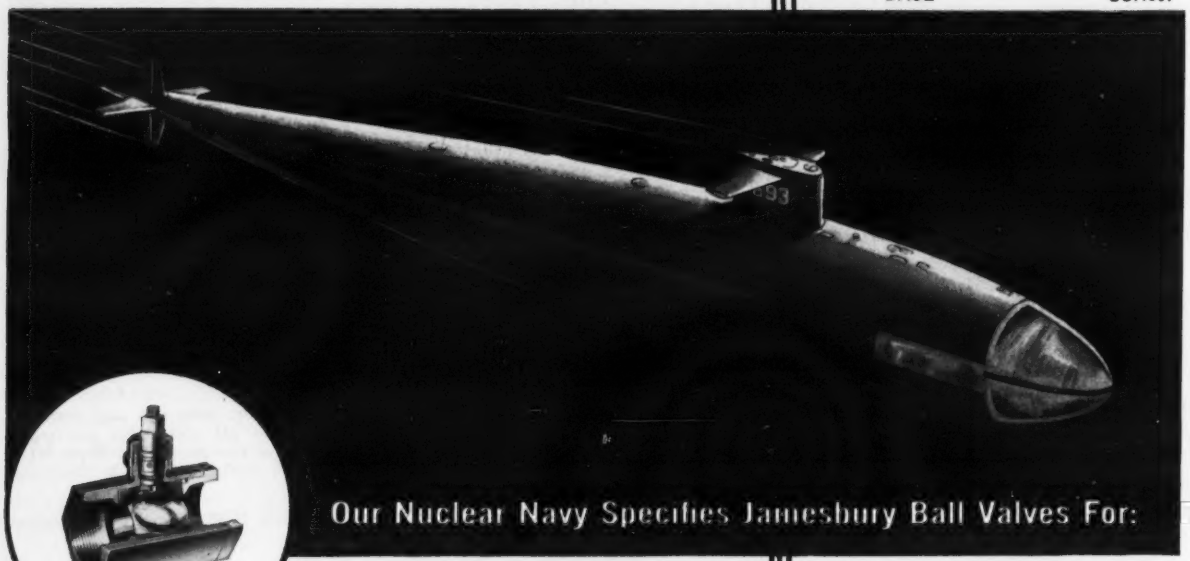
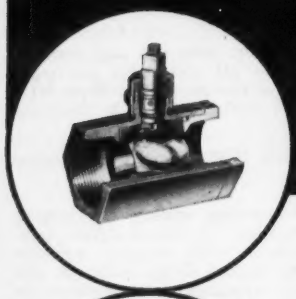
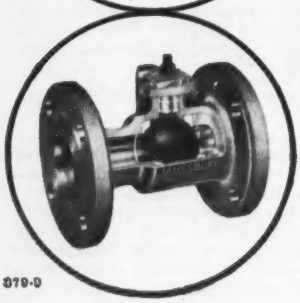
PLUNGER	SSN595
POLLACK	SSN596
BARB	SSN603
HADDO	SSN604
JACK	SSN605
TINOSA	SSN606
DACE	SSN607



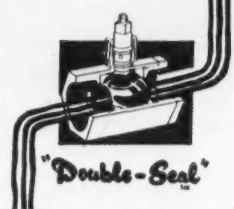
Our Nuclear Navy Specifies Jamesbury Ball Valves For:





Jamesbury High Pressure "Double-Seal" Ball Valves At Work In Air & Hydraulic System.

Unique Jamesbury "Double-Seal" Ball Valves serve throughout Industry. Write today for the Jamesbury brochure "At Your Service".



- compactness of design and size
- dependable, instant 90° on-off
- high impact strength
- easy maintenance
- low operational noise level
- corrosion resistance

• If any or all of these features is important in your valving requirements, then you too can depend on Jamesbury Ball Valves.

JAMESBURY CORP., 64 New Street, Worcester, Mass.

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Check 3911 opposite last page.

INSTRUMENTS & LAB

Industrial thermometers, air duct, moisture-proof, and multiform models, are presented in Bul F2 — Precision Thermometer & Instrument Company.

Check 3912 opposite last page.

Laboratory glassware manufacture is pictured with step-by-step photographic story of glassblowing art in "Behind The Diamond D" Bul — Doerr Glass Company.

Check 3913 opposite last page.

Analog computers, both general and special purpose, are reviewed and specifications given in four-page Computer Brochure — Computer Systems, Inc.

Check 3914 opposite last page.

Sheathed thermocouples, extension wire, terminals and special and typical mounting attachments are covered in Cat 101 — Research Instruments, Inc.

Check 3915 opposite last page.

Polargraphs, their accessories, operations and applications, are subject of 12-page Bul P — E. H. Sargent & Co.

Check 3916 opposite last page.

Time-delay relays are itemized in eight-page illustrated catalog. Featured in brochure are adjustable time-delay devices. Engineering Bul 5905 — Tempo Instrument Incorporated.

Check 3917 opposite last page.

Chromatographs, recording balances, extractors and other laboratory items are cataloged in "What's New" No. 38 — Scientific Glass Apparatus Co., Inc.

Check 3918 opposite last page.

Thermocouple data indicator which is useful in variety of situations may be obtained for $2.00 from West Instrument Corporation, 4363 West Montrose Ave., Chicago 41, Ill.

Process refractometer, designed for measurement and control of liquid organic and inorganic streams, is introduced in Bul 0714-4 — Mine Safety Appliances Company.

Check 3919 opposite last page.

Electrometers, micro-microammeters, and other electrical measurement and control equipment are cataloged in Cat 1960 which may be obtained by writing on your letterhead to Keithley Instruments, Inc., 12415 Euclid Ave., Cleveland 6, Ohio.

Hyrocarbon detector, self-contained portable instrument for rapid measurement of total organically-bonded carbons in atmosphere or gases, is given full treatment in eight-page Model 213 Bul — Instrument Division, Perkin-Elmer Corporation.

Check 3920 opposite last page.

Multi-pointer gage unit, used for pressure and level measurements and pneumatic transmitting or receiving, is detailed in Product Spec M42-2 — Bailey Meter Company.

Check 3921 opposite last page.

Recording oscillograph is subject of illustrated 16-page brochure. Topics discussed include evaluation by dynamic testing, description of 18- or 26-channel oscillograph, specifications and features, description of rapid-access magazine and other accessories, and specifications for galvanometers. Bul 1500 — Electro Mechanical Instrument Division, Consolidated Electrodynamics.

Check 3922 opposite last page.

Remote control system, operated by hydraulics, is covered in Remote Control Cat — Hydronic Corporation.

Check 3923 opposite last page.

Recorders and recording control stations which continuously record standard 4-20 ma d-c output of transmitter or transducer are subject of four-page Spec FS-301-8 — Industrial Division, Minneapolis-Honeywell Regulator Company.

Check 3924 opposite last page.

Gas chromatography applications and apparatus, with particular reference to seven common insecticides, is featured in Aerograph Research Notes — Wilkens Instrument Company.

Check 3925 opposite last page.

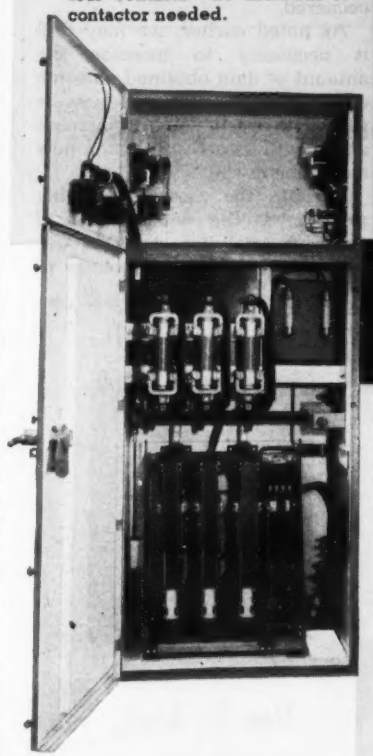
Control equipment, including automatic temperature, pressure, level and flow controls, as well as counters, switches and automation controls, are presented in comprehensive catalog. Industrial Controls Cat may be obtained by writing on company letterhead to Literature Control Section, General Controls Co., 801 Allen Avenue, Glendale 1, Calif.

Mineral-insulated thermocouples, which are available in over 24,000 assembly combinations, are listed in 20-page Cat 300 — Conax Corporation.

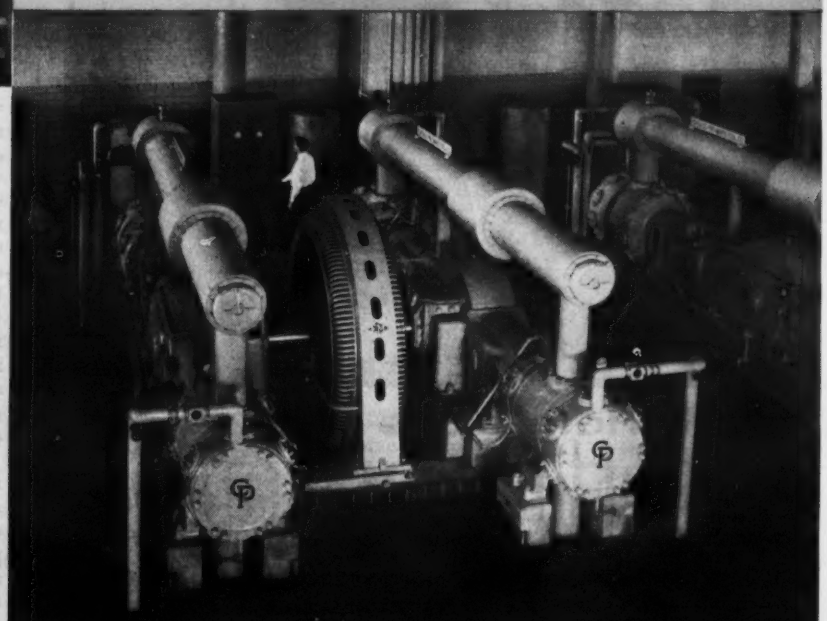
Check 3926 opposite last page.

Above and at right • **Four EC&M 1000 HP, 2300 Volt Synchronous Starters on air-compressor drives in Chrysler Corporation's new Ohio Stamping Plant at Twinsburg. Purchased and installed by Hatfield Electric Co., Cleveland, Ohio.**

Below • **Inside view of starter showing compact arrangement of fuses and contactor. The three arc shields slide out for quick access to both front and rear contacts — no draw-out of contactor needed.**



The most complete synchronous motor protection you can buy



EC&M 2200-4800 VOLT STARTERS

• A push of the "start" button gives you complete protection during starting and running—*plus* EC&M *fully automatic synchronization.* Throughout the entire sequence, motor windings are completely protected and synchronization occurs at the most favorable time. Should the motor pull out of step because of voltage dip or overload, the field is automatically removed. Re-synchronization occurs when the motor re-accelerates the load. Short circuit protection is provided by current-limiting power fuses working in conjunction with EC&M's *"certified"* high-interrupting-capacity ZHA air-break contactor.

For complete details...

WRITE FOR BULLETIN 8210

SQUARE D COMPANY

EC&M DIVISION • CLEVELAND 28, OHIO

wherever electricity is distributed and controlled

8897-R

Check 3927 opposite last page.

How Textile Mills

PREVENT REJECTS

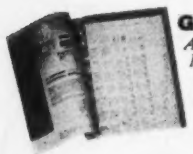
with Neptune Liquid Meters

"Rejects" in weaving dropped way down when Cannon Mills installed Neptune Auto-Stop meters to measure the *exact* amount of water into the warp size mix. Warp size is a mixture of starch, tallow and water. If it's too thick the starch "balls up" on the warp; too thin and the warp is too limp.

Uniformity of warp size was so improved when the first meter replaced the inaccurate dip-stick that *additional* Neptunes were installed throughout all Cannon Mills for warp size control.

Most common liquids are now being measured by Neptune meters... hot or cold water, oils, syrups, brines, soap solutions, chemicals... in hundreds of plants.

Available with Auto-Stop feature to deliver preset quantity of liquid; with Auto-Switch to operate pumps, valves, etc.; and with Print-O-Meter register to give a dispute-free record of each batch. Capacities: 2 to 1000 gpm. in bronze; 20 to 100 gpm. in stainless steel. Send for Meter Application Bulletin 566-API.



GET THE FACTS
Ask for helpful Meter Data Bulletin 566 AP See Neptune Data Pages in Chemical Engineering Catalog.

neptune

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Check 3928 opposite last page.

The Delaney Clause

From page 29

law may require us to increase the number of tests, or the test population, or both, to obtain more data. Our new Biological Laboratory is staffed and equipped to handle any anticipated increased load, and if necessary, we can supplement this effort by using outside testing facilities. We do not expect to be hampered by the new law.

It is doubtful that the new law will make food safer. The record shows few cases of poisoning by, or deleterious action of the foods we eat. Problems in the past usually have arisen when a) the recommendations of food additive or pesticide manufacturers on use of their products have been disregarded; b) food known to be bad has deliberately been treated to make it appear fit for human consumption; and c) accidental contamination or unsuspected deterioration of foods has occurred.

As noted earlier, we may find it necessary to increase the amount of data obtained on some additives. Our current guess is that our costs might increase about 20% as a result of the new amendment.

Perhaps the most challenging problem is the development of sensitive analytical tests to determine very small amounts of additives in foods.

Don D. Irish, Ph.D.
Director
Biochemical Research Laboratory
The Dow Chemical Company

It is recognized that a sound law controlling the quality of food is most desirable. The main objectives of the 1958 Food Additive Amendment are sound: need for pre-evaluation of safety is obvious; the principle of safe "under the conditions of use" is practical and scientifically sound; and the FDA should be furnished the scientific information upon which the evaluation of safety is based.

It is most important that scientific decisions be made by scientists. The FAO/WHO Expert Committee on Food Additives stated "It cannot be too strongly emphasized that, just as the conduct of the experiments designed to test safe use is the responsibility of the scientist, so also is the evaluation and interpretation of the data from the experiments." It behooves both industry and government to base their operation under the law on this principle.

The so-called "Delaney Clause" is an unfortunate denial of this principle as it legislates a scientific decision before the facts are in and isolates one particular physiological response from the main principles stated in the law. It appeals more to the emotions of laymen than to the judgment of competent scientists.

It is most important that both industry and government promptly find an effective method of operation under the intent of the law without serious discouragement of the necessary scientific development within the food industry. Misapplication by either party for commercial expediency or political expediency could be destructive.

The law places responsibility on the personnel of the FDA in such a way that, being no more than human, they could easily become restrictively conservative. It is hoped that by efficiency, and soundness of scientific judgment, they can fulfill the intent of the law and still avoid unnecessary discouragement of needed scientific development in the food field.

In a like manner, industry must face squarely its responsibility for seeing that it has appropriate data and competent scientific advice and that it makes scientific decisions regarding the safety of its products.

To the extent that both parties act in a responsible and reasonable manner, and only to that extent, can we maintain or improve the quality and quantity of our food supply.

Bernard L. Oser, Ph.D.
Director
Food and Drug Research
Laboratories, Inc.

There is no denying the fact that the basic principle of the Food Additives Amendment which makes prior testing for safety an obligation of the manufacturer or user, is sound and in the interest of public health. The situation verging on panic that has developed in the food industries arises from the application of the law to substances used for many years without government interference and with apparent safety.

Uncertainty on the part of industry as to whether these are excluded from the definition is due largely to the construction placed by FDA upon "general recognition" of safety by qualified experts and industry's attitude of watchful waiting for "exempt lists." Delays involved in obtaining and assessing the opinions of competent scientists on proposed lists and from the necessity on the part of users or manufacturers to obtain information never before required, have accounted for the slow progress made during the past year.

In the coming months it is expected there will be an acceleration of efforts to seek clearance or compliance under the food additives procedure and, extensions permitting, increased pressure upon chemical and biological laboratory facilities of the country. There will also be greater realization of the significance of the law and possible efforts to get Congressional relief from certain of its provisions.

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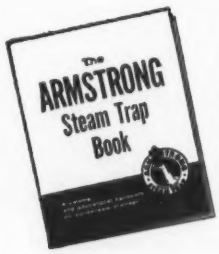

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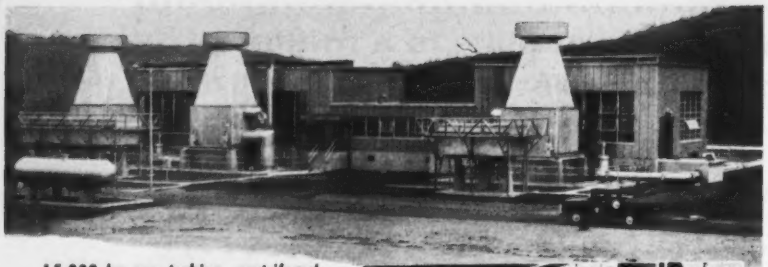
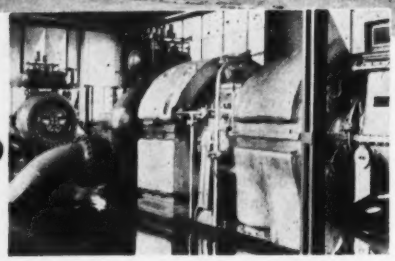


15,000 hp gas turbine, centrifugal compressor station uses HC® units by Young to cool lube oil.



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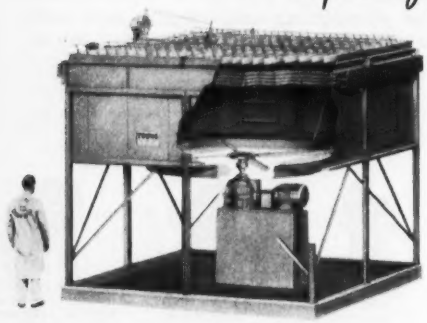

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AEC Patent Policies

From page 25

3) No one company or individual should be permitted to control the future development of the field through patents.

4) There is no longer any incentive to invent anyway — most inventors work for companies and the companies have title to the patents.

5) Inventing is different today; it's not done by individuals in their own small shops, but in great laboratories by teams of people with expensive equipment. The inventors are professionals who were hired to invent.

6) Inventing is a spontaneous activity and is done for the satisfaction of the inventor. The patent system merely serves to guide it into useful channels.

7) The one who takes the greatest financial risk should get the patent rewards; thus, if the AEC pays the bills, the public should have the patent rewards.

8) No individual or corporation should be permitted to make an unreasonable profit on government work. No company should therefore have an undue advantage over any other company with respect to patents, or otherwise, as a result of AEC work.

I believe that all these arguments are false. Take the first — the field is so important that it must be for all the people. This implies that private patents might make them otherwise. Has this been true in the past? — of the electric light, the airplane, the transistor? Of course not! Why should it be true now?

The second argument is indefensible if we contrast defense expenditures and D.O.D. (Department of Defense) patent policies with those of the AEC and Section 152 — $40 billion vs $3 billion.

The third: I think what is meant here is *exploit* rather than *control*, and for 17 years. It's hard to conceive of a company that would *not* try to exploit a commercial atomic energy patent if that patent covers a device that makes the whole field successful. They deserve the patent, and if they use it wrongfully to control the field, there are

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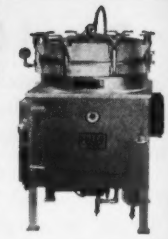

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remedies available in other laws.

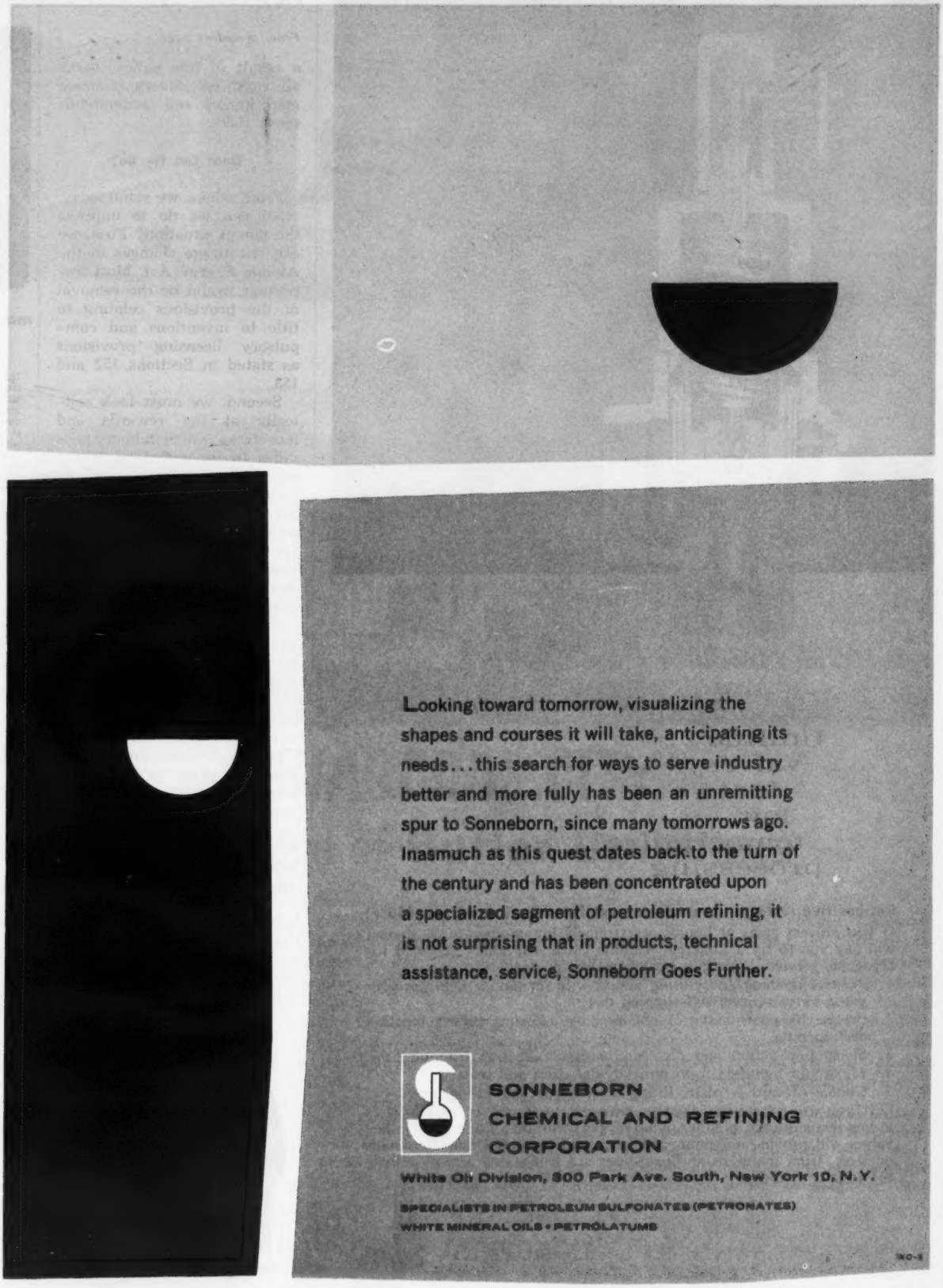
The fourth argument is faulty on two grounds. The companies have lots of incentive to get inventions. They buy patents, license them, and set up laboratories to develop others. Inventors who have assigned their patent rights to companies also have incentives. They usually get financial rewards as well as prestige, advancement, and often a lifetime job if a patent is significant.

As for the fifth, it is very rare that a team comes up with a basic idea. It is generally one man on the team. His idea may be refined, advanced, and made practical by other members, but it was his idea.

Perhaps the economists and psychologists should get in on the sixth argument. I just don't believe it applies to very many inventors. They are all quite human and enjoy prestige, credit, financial reward, and a comfortable life just as much as anyone else.

Point seven might better be stated: If the AEC pays the bills, no one shall have any patent rewards. The entire incentive aspect of the patent concept is destroyed if the public gets the patent rights. If these rights belong to the taxpayers, then we need some new type of reward for the inventor. A compulsory license at a reasonable royalty is no substitute for the incentives provided in the past. Private companies have found ways to reward their inventors so that incentive to successful invention remains strong.

On to argument eight. What does the word "unreasonable" imply? Unreasonable compared to what? The best solution seems to be the renegotiation board. As for the second part of this argument, it is not possible to buy, with taxpayers' money, the greatest advance for every dollar, if at the same time, no unbalance of advantage is to occur. In our situation in atomic energy today, the AEC should buy the best — we will need every bit of it. If some advantages accrue to some companies as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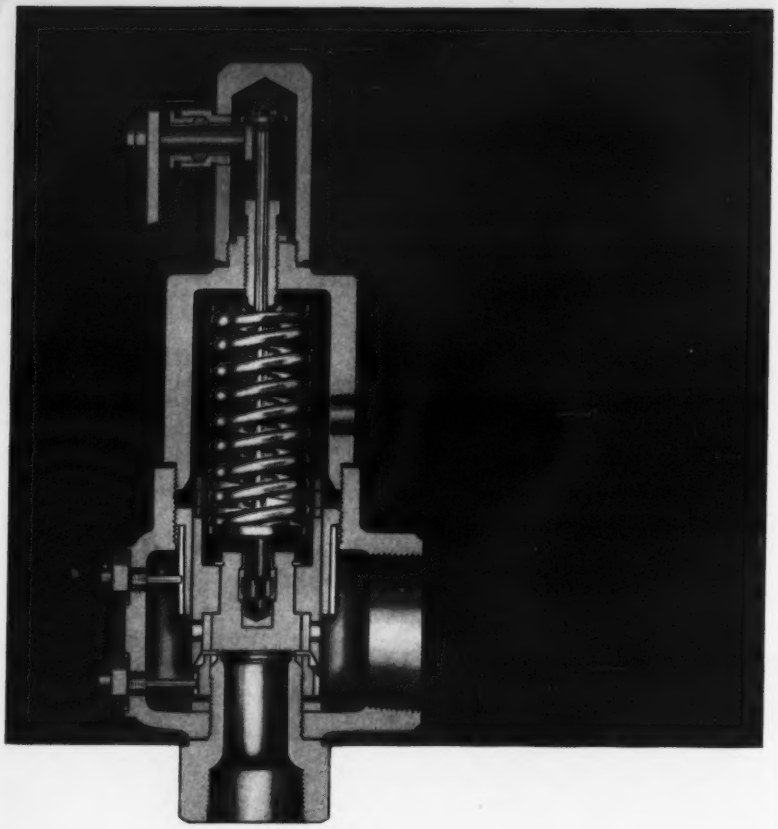

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AEC Patent Policies

From preceding page

a result of this policy, that's all right too. Every business man knows and understands these risks.

What Can We Do?

From where we stand today, what can we do to improve the patent situation? First, we can encourage changes in the Atomic Energy Act. Most important would be the removal of the provisions relating to title to inventions and compulsory licensing provisions as stated in Sections 152 and 153.

Second, we must look critically at the rewards and incentives which industry provides to its inventors. Is the patent assignment and release form the best way to inspire invention? Are the patent awards measured at the time the invention is in use larger than the awards granted under a company suggestion system?

Third, we must oppose other administratively imposed restrictive patent policies. The requirement for surrendering background patent licenses as a consideration for obtaining a contract is a case in point. This is tantamount to demanding property **without consideration**. How many companies with a strong patent portfolio and great experience in a field will risk that position to obtain an AEC contract? Yet these are the very

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companies with the know-how who are most likely to make rapid progress. The nation should obtain their services.

Fourth: In the area of foreign patent rights, I see no justification for the requirement that these also belong to the AEC. Foreign patent rights are among the few tools with which U.S. industry can negotiate itself through foreign nationalistic barriers and into foreign markets. Preemption of foreign rights even to patents developed under AEC contracts poses a serious obstacle to U.S. industry's participation in foreign nuclear markets.

Finally, I urge that the AEC consider recommending to the Congress the adoption of D.O.D. patent procedures. We repeat often that one of the objectives of the AEC is to foster the development of a thriving nuclear industry. We certainly have a healthy defense industry.

The full dedication and drive of industry will be needed to meet our future domestic power needs and lend support to our nation's foreign policy objectives through atomic power. These power needs may well be met by other alternatives if stumbling blocks are placed in the way of nuclear power and if incentives are removed from its development.

(Based on speech given by Dr. Davenport at recent Atomic Industrial Forum Conference.)

PROCESS DYNAMICS — PRO & CON

Do we need experimental data derived from actual plant operations to prepare mathematical models, and to check the validity of computer solutions of these models? Differing views on this subject will be presented in the April issue as CHEMICAL PROCESSING continues its reporting on Process Dynamics.

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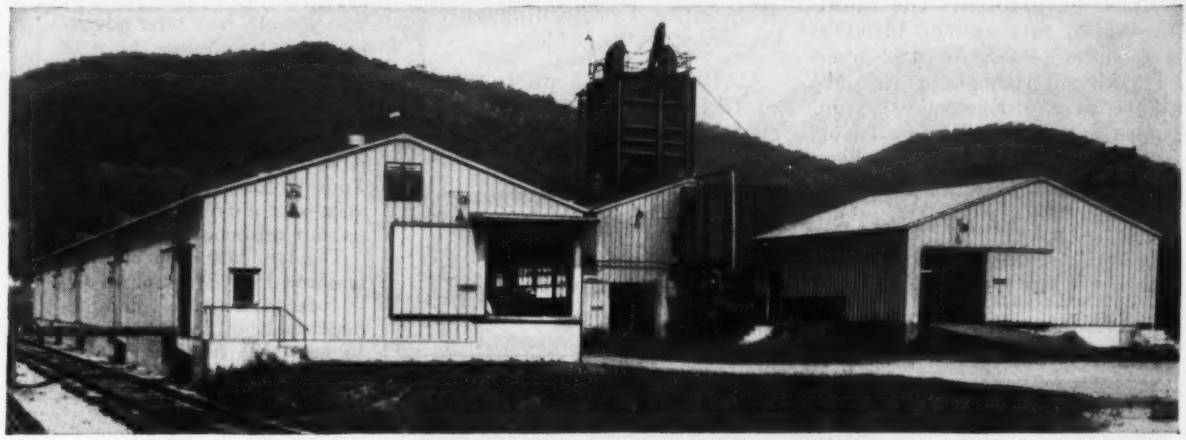

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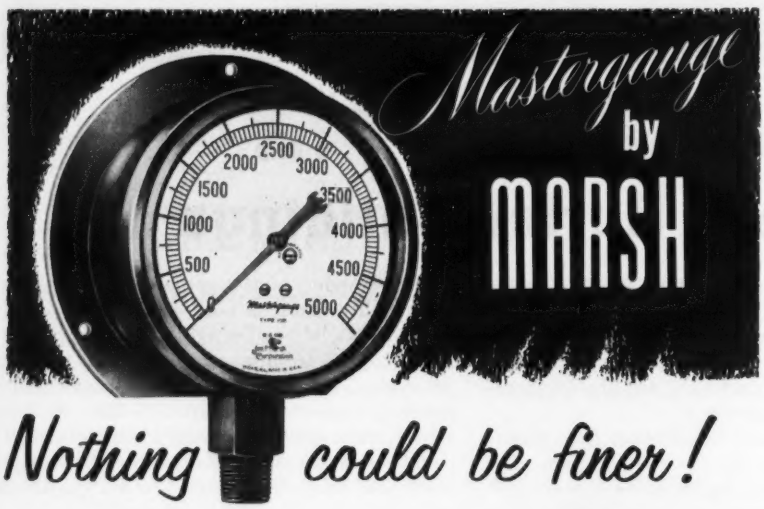

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National Starch

From page 27

Currently under similar genetic development is a corn hybrid of about 90% "amylose" content. Again sponsored by NSC and American Maize-Products, development is being carried on by Bear Hybrid Corn Company of Decatur, Ill.

"High amylose corn may be as important as anything we've come up with yet," predicts NSC's president, Don Pascal. "Films and fibers can be made from amylose and have good strength properties, although many economic and technical hurdles must be overcome. In certain respects, this material may offer advantages over cellulose as it is easily solubilized by heat and pressure, in contrast to the drastic treatment required by cellulose. Then, too, it can be cross-linked for high stability. Thus a low-cost material of vast possibility is still eluding us, but we hope not for long."

The last 1959 crop of high-amylose hybrid contained 50-60 percent amylose, and geneticists have not yet had time to grow the number of generations necessary to produce ultimate concentration.

"It will be about two more years before we'll know the outcome," says Caldwell, "We're hoping for 90 percent."

NSC's Alexander Research Center (named for the firm's founder, Alexander Alexander) is located at Plainfield, N.J. Its annual budget is about $1.5 million, which is approximately 3½ percent of sales. The center is currently being expanded by one-third, with construction expected to be completed this spring. Alexander laboratories is staffed by about 200 persons, many of these being technologists and scientists aided, according to the modern concept, by trained technicians.

A staff of 75 technical service personnel operates within the sales department's 25 field offices. Still another staff is made up of product development technologists, who roam far afield and are constantly looking for applications which could be served by products not yet manufactured by the company. Oftentimes, product development suggests the product which research pro-

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duces and proves. Then technical service takes it over, writes instructions for commercial use, and puts on customer plant trials in cooperation with sales.

Veteran Hands at Helm

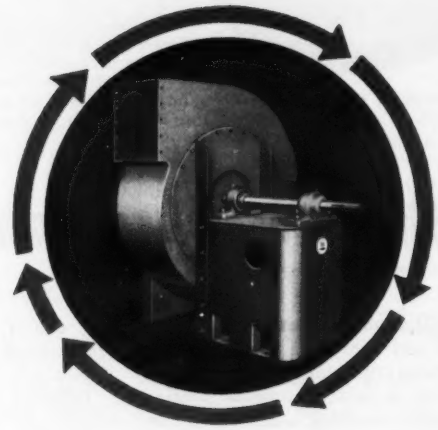
One of NSC's obvious strengths is the youthful vigor and yet profound experience represented by its executive group. It is made up primarily of individuals who have had many years of service with the firm, something made possible by the company's policy of promotion from within.

After 20 years as president of NSC, Greenwall was in 1958 elected chairman of the board. Don Pascal was then made president. As one who literally worked his way up, Pascal has seen service in virtually every major operation. While a youthful employee, he obtained his B.S. in Chemical Engineering by attending night school for eight years.

NSC's dynamic status is symbolized by the title of the firm's senior v-p, James Dillon. He is senior v-p in charge of *expansion*. Like many other American corporation executives, he recently returned from studying potential of Europe as a possible next great field for development of a packaging industry.

Another noteworthy background is that of Bob Merritt, v-p of manufacturing. Proud possessor of a Ph.D. degree in engineering, Merritt is said to be responsible for the corn wet-milling industry's first full-scale use of several processing innovations such as miniature hydroclones and continuous centrifuges. Merritt has designed the firm's several polymerization plants, which obviously had to show superior comparative economics over purchasing polymer from large suppliers.

Sales in NSC's organization is the responsibility of two experienced individuals, S. F. "Woody" Thune, v-p adhesive and chemical sales, and John "Jack" Fitzgerald, v-p starch sales. Although there is an overlap between the functions of these two executives, "selling adhesives, for example,



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Speed . . . Quality . . . Economy in BATCH PROCESSING

Duradiant burner setting

Built by Selas for a prominent chemical company, this enclosed setting, complete with manifolds and control panel, was shipped as a packaged unit ready to connect with fuel and process lines. A reactor fits snugly into setting with bottom 10 in. from burners. Precise control and placement of heat eliminate hot spots, increase reactor life.

with Selas Duradiant® Heating

Control in uniformity of heat application and adherence to critical programming requirements are important features of Selas Duradiant heating for batch cooking chemicals, oils, resins, varnishes, inks.

Fast, radiant gas heating, rapid burner response and turndown ratios of 15:1 or more, make Selas settings as versatile as they are controllable . . . enable them to meet any time-temperature cycle within ±2° F, and duplicate it, batch after batch.

Efficient, low-cost Duradiant enclosed or open settings are steel-encased, shipped with all refractory in place for simple installation. "Packaged" equipment may include shop-assembled piping and complete, automatic control instrumentation.

Send for Bulletin DC-1 "Heat Processing Batch Liquids."
Write to Mr. Paul F. Berg, General Industry Div., Selas Corporation of America
103 Dresbertown Road, Dresher, Pa.

Duradiant is a registered trade name of Selas Corporation of America

SELAS CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA
HEAT AND FLUID PROCESSING ENGINEERS development · design · construction

Check 3940 opposite last page.

National Starch

From preceding page

takes a different approach than selling starch," explains president Don Pascal. "As long as starch is such an important commodity, you can expect we'll be constantly riding herd on it."

Recently, the Sales Department underwent reorganization of its technical groups. Established was a Technical Development Department, under which Technical Service and Product Development will serve. Also created was a new Structural Products Division, within which will be a resin group serving the paint and coating industries. Also within the division will be a structural group, serving structural and wood-working industries regarding adhesives and particle board. As in the past, this reorganization follows *industry lines.*

The Research and Development Committee is for all practical purposes the firm's operating committee. This committee meets about once each month. It is made up of the board chairman, president, senior v-p expansion, v-p manufacturing, v-p adhesive and chemical sales, and v-p starch sales.

Five-point Policy

A factor which has had considerable positive impact on the firm is Greenwall's basic policy of company management. This boils down to: 1) promote from within, 2) management by group, 3) extensive R&D program, 4) reinvestment of depreciation allowances, plus money borrowed on loans for expansion, 5) a one-price policy.

"The most important thing about such policies," explains Greenwall, "is whether they are really carried out. If you "stack the court" you don't have group management. Nor do you if the recommendations of the group are consistently ignored. We have been particularly fortunate in being able to do these things as they should be done."

An interesting further aspect of the firm's management concepts has to do with personnel training. Today the firm has a full-time director

4½" DIAL THERMOMETERS

Made in 3 types to suit any requirements. Rigid stem, wall or flush mounted, 11 inches of scale reading. Interchangeable with standard industrial separable sockets. Stem can be placed at any angle and case can be rotated to any readable position.

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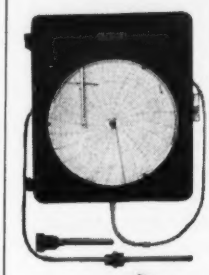
Temperature Indicating Instruments



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Twelve inch die-cast aluminum case with black or white wrinkle or satin finish. Single or multiple pen construction. Electric or spring wound clock, 24 hour or 7 Day Revolution. Flexible Armor and bulb of stainless steel. Ranges —40 +950°F or Equivalent in °C.

INDUSTRIAL THERMOMETERS

Red-Reading Mercury —Extruded brass case — chrome finish. Ranges —40 + 950°F or Equivalent in °C.

RED-READING MERCURY LABORATORY THERMOMETERS

Thoroughly annealed for permanent accuracy. Complete line A.S.T.M. and fractional division types.

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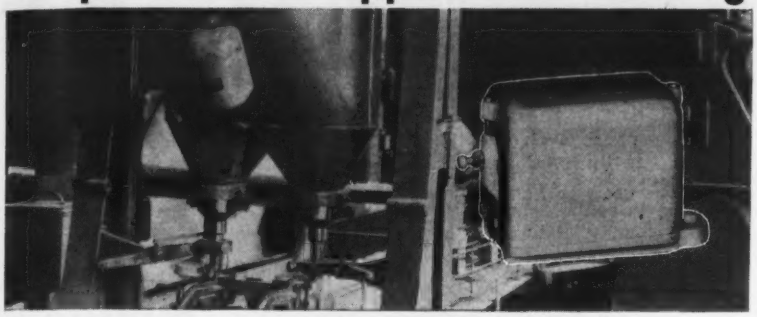
PALMER
THERMOMETERS, INC.

Check 3941 opposite last page.

SYNTRON cost-reducing equipment of proven dependability

keep bins and hoppers free-flowing



SYNTRON BIN VIBRATORS

—on bins, hoppers and chutes provide an efficient, effective method of keeping bulk material (fine powders, granular or chunks) flowing freely to packaging, processing and other operations.

Their high speed (3600 VPM) instantly controlled vibration moves most bulk materials; positive control assures a smooth even flow; rugged construction means longer service; simplicity of design, fewer moving parts, lower maintenance.

SYNTRON Electromagnetic Bin Vibrators will make any bulk material handling operation more efficient.

Write for complete informative literature

SYNTRON COMPANY

Quality Equipment Since 1922

110 Lexington Ave. Homer City, Penna.

Check 3942 opposite last page.

Reduces piping costs ...stops corrosion

Plants, large and small, are switching to unplasticized polyvinyl chloride (UPVC) piping for corrosive services to make these important savings in first costs and in operating costs: UPVC piping materials cost substantially less than metals, alloys or lined material commonly used in the same services. It can be erected easily and quickly. Widely used socket type joint can be made in about a minute with solvent cement and a brush. UPVC piping is easy to handle...weighs less. It does not have to be painted. It stops piping corrosion and galvanic action.

The ttp line of injection molded UPVC fittings, flanges, valves, solvent cement and thread lubricant is available nearby from your Tube Turns Plastics' Distributor. He can supply *all* your needs on one order and can help you with design and installation data. Write us for the complete line catalog, Bulletin 119. TUBE TURNS PLASTICS, INC., Dept. CP-3, 2929 Magazine Street, Louisville 11, Kentucky.

Check 3943 opposite last page.

of training, who arranges courses that "are usually given from the top down." Recently, after hearing one near-the-top executive give a talk which left much to be desired, Greenwall instituted a course in "public speaking in the art of communications." Invitations were sent pointedly to certain staff members. In such an undertaking, the number one student is invariably Greenwall. Previous courses given include finance and business law, and human and public relations. Outside organizations are sometimes called upon to present portions of courses.

NSC's 10 plants are in Plainfield, N.J. (packaging and structural adhesives, PVAC, and copolymers plus rubber adhesives and tapioca refining); Indianapolis, Ind. (corn wet-milling); Meridosia, Ill. (PVAC, other polymers and copolymers); Chicago, Ill. (packaging adhesives); Goffstown, N.H. (particle board); Black Mountain, N.C. (particle board); Baltimore, Md. (dextrines and adhesives); Wallington, N.J. (rubber-based adhesives); San Francisco, Calif. (packaging adhesives); Montreal, Canada (adhesives); Toronto, Canada (PVAC and adhesives); Slough, England (PVAC and adhesives); Mexico City, Mexico (PVAC and adhesives).

For capital expansion, NSC has appropriated more than $10 million for the five-year period ending 1959. During 1959, $2.7 million was spent, and $4.7 million was appropriated for 1960 to make possible enlargement of corn-grinding capacity at Indianapolis by one-third to seven million bushels per year.

An integrated data processing system has been installed for order writing, billing and improved statistical data for management.

Financially, NSC stock has been attractive to major investment trusts — often regarded as a fair weather barometer. Chemical Fund and Investors Diversified Services each own 5% of the common stock. Officers and directors of NSC control close to 45% of

for difficult fluid flow problems use

Flexible Tubing MADE FROM TEFLON*

When PF flexible tubing made from Teflon is used on the most difficult fluid flow applications, it turns in an amazing performance: extremely long life because it is unaffected by any commercial solvent; application to unusual jobs because it retains its flexibility and toughness even at temperatures as low as -450°F. and higher than 500°F.; easily cleaned and sterilized because of its smooth, chemical resistant surface. In addition, this tubing has very low permeability and its translucency shows fluid flow.

Some of the many places where unique PF flexible tubing made from Teflon is used include:

- acid, solvent and catalyst lines
- sampling tubes
- thermocouple wells
- laboratory tubing
- tubing for waste handling
- fuel lines
- hydraulic lines
- medical tubing
- tubing for creameries
- tubing for food manufacture
- inert lines for pharmaceuticals
- deionized water

Write, wire or call us with your difficult fluid flow problems. We can solve them with flexible tubing made from Teflon tailored to meet your size, color and application requirements. Our normal procedure includes inspection and proof pressure testing every inch of the material so that you are sure of a uniform, highest quality product. Flare, insert and ferrule type fittings can be used with this PF tubing.

PENNSYLVANIA FLUOROCARBON CO., INC.

1115 N. 38th Street, Phila. 4, Pa.

EVergreen 6-0603

TWX: PH 252

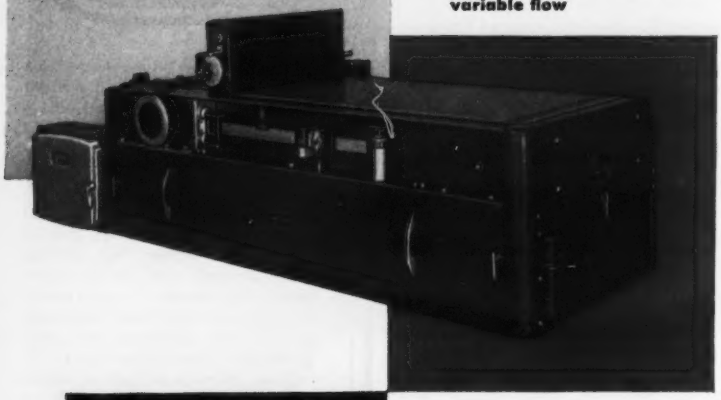
*DuPont registered trademark

Check 3944 opposite last page.

POSITIVE CONTROL OF MATERIALS IN MOTION BIF METERS FEEDERS CONTROLS

B-I-F BELT WEIGHER SOLVES PROCESS MEASUREMENT AND CONTROL PROBLEMS

- Checking production line output
- Checking in-plant inventory
- Weighing incoming and outgoing bulk shipments
- Evaluating process efficiency
- Density checking
- Batch weighing
- Signal producing for pacing additive materials proportional to a variable flow



CASE STUDY No. 1

BIF Omega **Pneu-Weigh Belt Weigher** checked production line output of 50 volumetric feeders to maintain critical limits . . . reduced plant downtime, lost man hours and production holdups!

Each feeder on proportioning line of a major formulator was putting out particular fraction of formula on continuous basis. Pneu-Weigh, installed at end of collector conveyor to "watchdog" operation through remotely located instrument, indicated less-than-expected output. A check revealed delivery rate of one volumetric feeder crtically lower than its limit. Result: over 100 tons of formulated product saved from being remade at considerable expense in plant time, man-hours, planning, removal of paper-bag packages, and subsequent resacking.

You'll find opportunities for cutting costs and improving efficiency in process feeding when you consult B-I-F — manufacturer of the most complete line of solid and liquid feeders and weighers.

B-I-F Industries

BUILDERS-PROVIDENCE • PROPORTIONEERS • OMEGA

METERS • FEEDERS • CONTROLS / CONTINUOUS PROCESS ENGINEERING

Pneu-Weigh offers extremely high accuracies, wide ranges, capacities in compact, uncomplicated unit. Request Bulletin 36.20-1 for details. Write **B-I-F Industries, Inc., 387 Harris Avenue, Providence 1, R. I.**

Check 3945 opposite last page.

National Starch

From preceding page

outstanding common. The firm's capitalization is moderate; long-term debt is $4½ million with a commitment for an additional $4 million for expansion during 1960. Dividend policies have been conservative — cash payments have amounted to about one-third of earnings. For NSC 1958 was a good year — in contrast to the rest of the chemical industry. During that year rate of return on common stockholders equity was a lush 19%. "This meant we didn't show the big *increase* in earnings and profits in 1959 that would be consistent with the rest of the chemical industry, which was considerably slower during 1958," comments Greenwall.

What is NSC's future? Is it secure as a progressive but comparatively small operation in the chemical company group? There are many reasons which point to continuing success for the firm. Basically, its "roots-in-its-customers'-problem approach" is one which will provide lead time over drives by larger producers who enter certain markets with improved or lower cost materials — but without industry applications know-how.

"We know the chemical companies will every so often come up with new products that will make it tough for us," says Don Pascal. "When they do this, we'll have to dig in all the harder and see if we can't come up with something more specific, that will better fit the customers' needs."

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Check 3946 opposite last page.

THAT'S INTERESTING

Cloth sheds molten iron

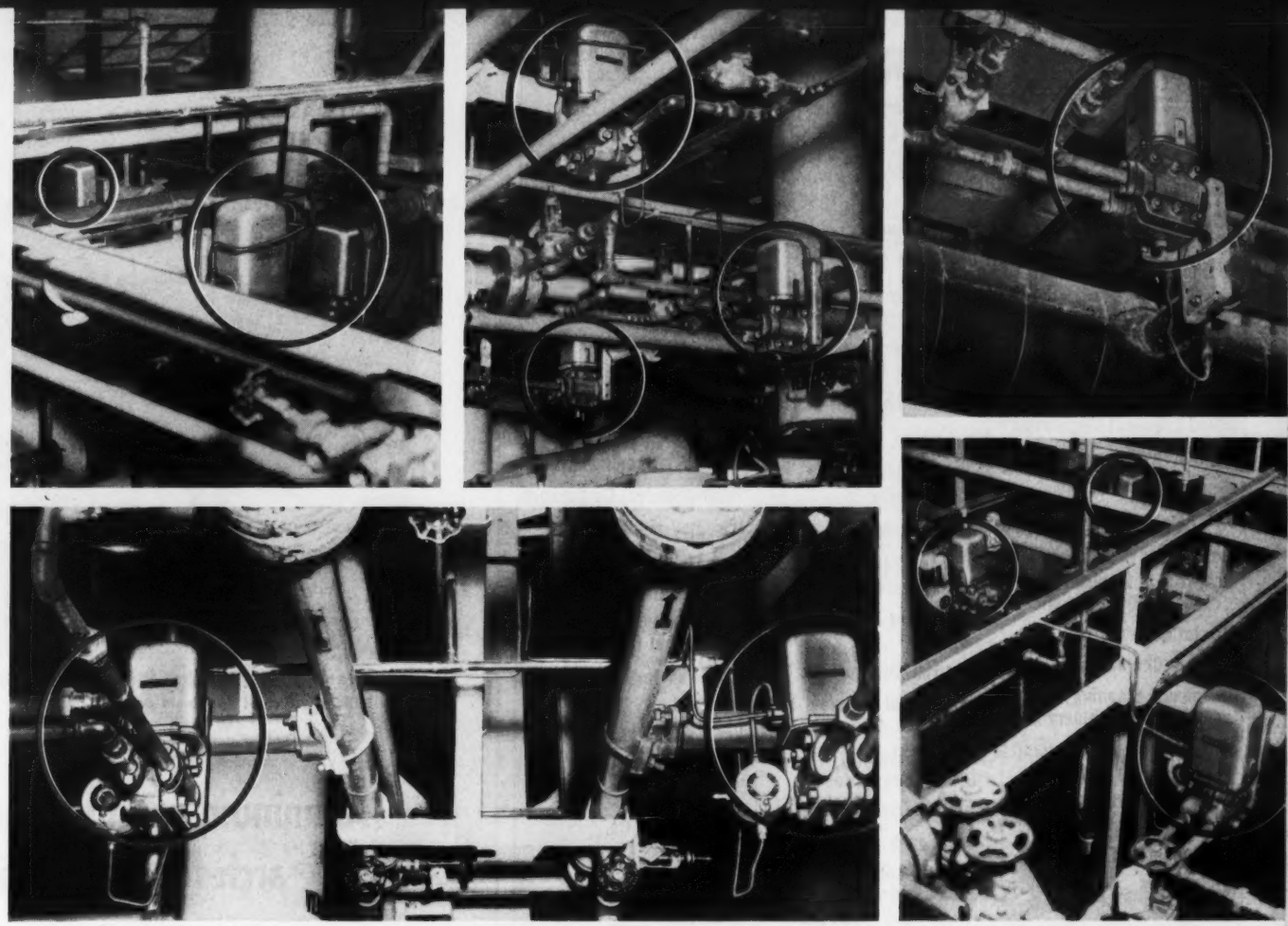
Fabric which will shed molten iron and ferrachrome at temperatures up to 3000°F has been developed by Thermoid division, Southern Asbestos Works, Charlotte, N.C. In splash test, material emerged free of burns, chars or even brown spots.

Treated asbestos is given special coating to produce life-saving material.

Supporting role

Plastics, particularly tough polyester film, are winning a supporting role in women's undergarments and bathing suits. Endsdown Company of New York has developed process for forming Mylar, Dupont's polyester, into effective stays. Such stays can be sewn directly into garment, eliminating need to fabricate pockets for the stiffeners. They are rigid but resilient.

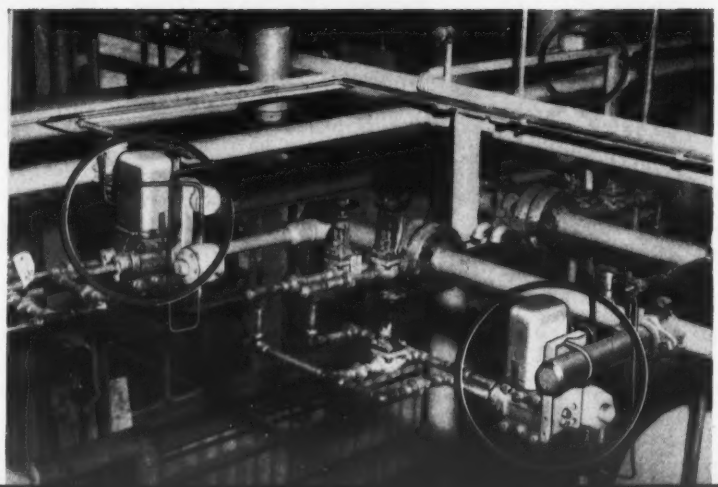
For more information on product at right, specify 3947 see information request blank opposite last page.



A few of the more than 100 Foxboro d/p Cell Flow Transmitters installed at Missouri Chemical Works of Hercules Powder Company, Louisiana, Missouri.

Hercules' Missouri Chemical Works reports:

"Foxboro d/p Cells* always accurate . . . never need re-calibration"



At Hercules Powder Company's 540-acre Missouri Chemical Works, there are over 100 Foxboro d/p Cell Transmitters in operation today — providing high-speed flow measurement and transmission throughout the ammonia, formaldehyde, methanol and pentaerythritol plants.

"Reliability is the big thing," according to Hercules instrument engineer J. J. VanSchaik. "We can install a Foxboro d/p Cell and forget it. Once it's calibrated, we know it'll stay that way. We never even stock spare parts."

Hercules especially likes the Foxboro d/p Cell for flow control. "Gives us closer control," says instrument engineer H. McCombie. "Eliminates one possible source of inaccuracy and maintenance trouble in the control loop."

Let Hercules' experience be your experience — with Foxboro d/p Cell Transmitters as the basis for your control system. Write for full details in Bulletin 13-11A. **The Foxboro Company, 813 Neponset Avenue, Foxboro, Massachusetts.**

*Reg. U. S. Pat. Off.

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FIRST IN FLOW

Partial list of companies using Ampco Centrifugal Pumps.

Abbott Laboratories
Adolph Coors Company
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Alox Corporation
American ENKA Corp.
The American Pulley Co.
Blatz Brewing Company
Brown & Williamson Tobacco Corporation
Bristol Laboratories, Inc.
Chagrin Chemicals, Inc.
Cincinnati Cleaning & Finishing Machinery Co.
City Water and Sewer Dept. Forrest City, Arkansas
Colton Chemical Co., a Div. of Air Reduction Co., Inc.
Consolidated Edison Co.
Continental Oil Company
Corn
C
Del Monte Foods
Emulsol Chemical Corp.
Enterprise Paint Mfg. Co.
Evans Cooperage Co., Inc.
The Fenn Manufacturing Co.
Ford Motor Company
General Chemical Division, Allied Chemical Corp.
The Genesee Brewing Company, Inc.
A. Gettelman Brewing Co.
Globe-Union, Incorporated
Graver Water Conditioning Co.
Peter Hand Brewery Co.
Huntington Laboratories, Incorporated
Independent Milwaukee Brewery
Industrial Dyestuff Co.
International Minerals and Chemical Corporation
Jones & Laughlin Steel Corporation
Koppers Company, Inc.
Kraft Foods Company
The E. B. Lanman Company
Master Lock Company
d Chemicals, Inc.
mical Company
Miller Brewing Company
Modern Tool & Die Co.
Monsanto Chemical Co.
The Norwich Pharmacal Co.
National Aluminate Corp.
Patek Brothers, Inc.
Parke, Davis & Company
The Pure Oil Company
Petro-Tex Chemical Corp.
Pittsburgh Plate Glass Co.
Red Star Yeast & Products Company
Reichhold Chemicals, Inc.
Shell Chemical Corporation
Schenley Industries, Inc.
S. G. Taylor Chain Company, Inc.
Texas Butadiene & Chemical Corporation
J. C. Van Holten & Son, Inc.
Visco Products Co., Inc.
Torrington Water Co.
Union Carbide Chemicals Co.
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Companies with a critical eye on the cost of pumping corrosives use

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Let your Ampco Field Engineer help *you* cut pumping costs.

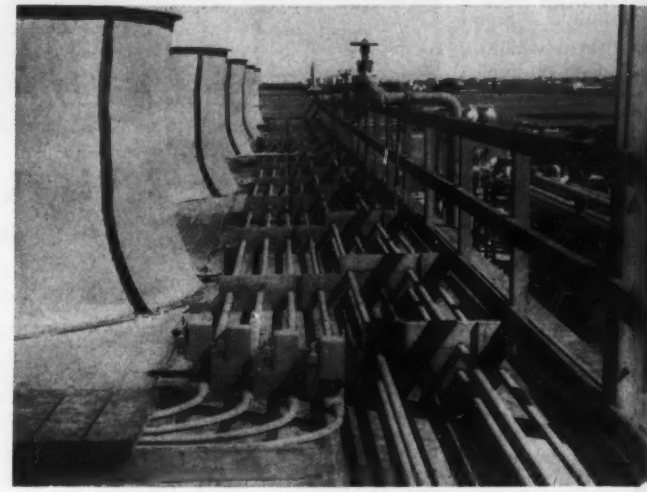
Write us for his name.

P-38

AMPCO® **AMPCO METAL, INC.** DEPT. 139C, MILWAUKEE 46, WISCONSIN
West Coast Plant: Burbank, Calif. • Southwest Plant: Garland (Dallas County), Texas

Check 3948 opposite last page.

CP **CORROSION CONTROL**



After 2½ years in corrosive atmosphere on the cooling tower, the electrical distribution system of aluminum conduit and copper-free aluminum fittings is still in good condition

Aluminum conduit and fittings arch-foe of corrosion

Resist climate and chemical vapors for 2½ years at petrochemical plant without sign of deterioration

H. M. TOMLINSON, JR., Celanese Corporation of America

PROBLEM: Corrosion of power and lighting conduit, receptacles, lighting fixtures and motor startup stations on six large cooling towers at Celanese Corporation of America, Bishop, Texas, caused a staggering maintenance program for more than ten years. Plant produces acetic acid, methanol, acetone, formaldehyde and paraformaldehyde.

Plant requires a circulation of 175,000 gpm of process water, cooled by six outdoor induced-draft cooling towers. Fans for these towers are driven by 25 hp to 60 hp motors — whose combined total of 2110 hp is transmitted through exposed electrical arteries.

While corrosive vapors played havoc with conduit made from another metal, copper-free aluminum Condulet fitting in center is unaffected

Prior to 1956 conduit had to be continuously painted or taped. Corroded sections of conduit fittings, switches and lighting fixtures had to be replaced frequently. In some cases complete rewiring of electrical system was needed.

Celanese petrochemical plant utilizes six large cooling towers

Shutdown time was required in many cases.

Solution: In an attempt to alleviate some of the maintenance costs related to corrosion, a number of different type materials and conduit installations were employed. A conduit material was needed which, after being marred, threaded and bent during construction, would resist corrosion induced by Gulf Coast climate, plant fumes and cooling tower vapors.

Of paramount importance in these corrosion tests was the need for: 1) a switch housing in which the operating shaft would not freeze after long periods of non-operation, 2) a bolted or threaded cover, easy to remove after continuous exposure to corrosive conditions.

Tests run by a manufacturer of electrical fittings showed that copper-free aluminum is resistant to sea water, acetic, nitric and sulfuric acids, ammonia compounds and a variety of other chemicals. Metal is protected by formation of an oxide film.

During the spring of 1956 a series of tests were begun on plant employing aluminum conduit and copper-free aluminum conduit fittings. Test sample consisted of an explosion-proof X-type conduit fitting with threaded cover. One of four hubs was connected to five feet of aluminum conduit threaded on both ends and marred with a pipe wrench.

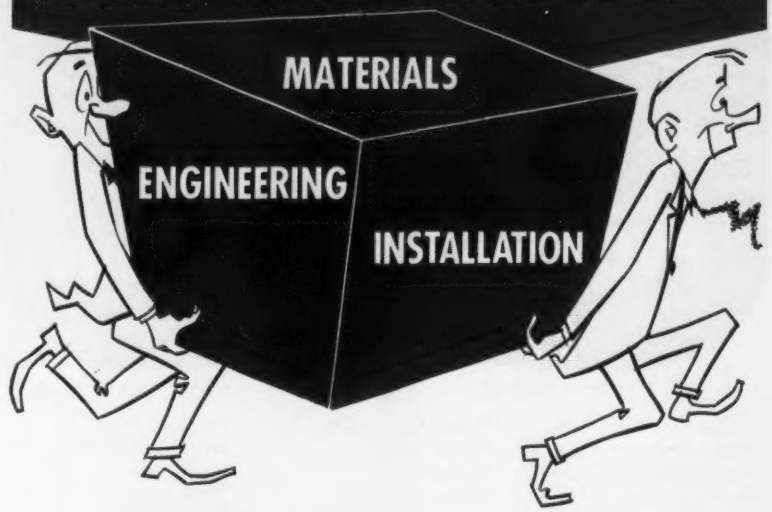
Second hub was connected to five feet of conduit made of another metal treated to withstand corrosion. Third and fourth hubs contained metal plugs, one of these using a reducer.

Results of Test

After a six-month period, rack was removed for examination. X-type conduit fitting made of copper-free aluminum showed no signs of corrosion. Five-foot length of aluminum conduit was also in good condition. Other conduit and one plug were completely corroded. Other plug and reducer with it showed small signs of corrosion where adjacent to each other.

Aluminum alloy used for conduit contains 0-0.1% copper, 0.2-0.6% silicon, 0.35% iron max, 0.45-0.85% magne-

CEILCOTE OFFERS THE ONLY COMPLETE PACKAGE CORROSION-PROOFING SERVICE



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INSTALLATION SERVICES

Now you can consolidate contracts . . . concentrate responsibility for corrosion-proofing service . . . save time and money! Ceilcote's "Complete Package" gives you the benefit of Ceilcote's extensive facilities plus 33 years of experience in developing, producing and installing corrosion resistant facilities. Working under contract, experienced Ceilcote engineers and competent installation crews handle all your problems and *guarantee job satisfaction!* Typical successful installations include flooring, tank linings, foundations, pits, piers, waste disposal systems as well as all types of Duracor reinforced plastic process equipment and ventilations systems. Write for complete information or call your nearest Ceilcote Sales Representative.

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67 Problems Solved by Van-Cor PVC Pipe & Fabrications

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PIPE

- Piping Sulphuric Acid
- Piping Hydrochloric Acid
- Piping Nitric Acid
- Piping Battery Acid
- Piping Vinegar
- Piping Brine
- Piping Natural Gas
- Piping Ammonium Nitrate
- Piping Gasoline
- Piping Fluoridation materials water system
- Piping Sodium Hypochloride (Bleach)
- Piping Pulp Stock Lines
- Piping Uranium ore slurry
- Piping Sand slurry
- Piping Coal slurry
- Piping Waste Lab Drains
- Piping Cyanide
- Piping Plating Solutions
- Piping Mercury (tube filling)
- Piping Pickles
- Piping Polysulfide
- Piping Wine
- Piping Gin
- Piping Whiskey
- Piping Sea water
- Piping Chicken feed
- Piping Demineralized H_2O
- Piping Warm glue
- Piping Salt water
- Piping Crude oil
- Piping Drinking water
- Piping Irrigation water
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- Piping Sewage
- Electrical Conduit
- Fishing Boat Outriggers
- Stair Handrails
- Vent Stacks
- Stand Pipes
- Downspouts
- Cathodic Protectors
- Electrolytic Interruptors
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- Hydrofluoric Fumes (Scrubber and duct)
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- Spray Booths
- Roll Coverings
- Swimming Pool H_2O Treatment
- Chicken Feed Troughs
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- Tanks & Tank Liners

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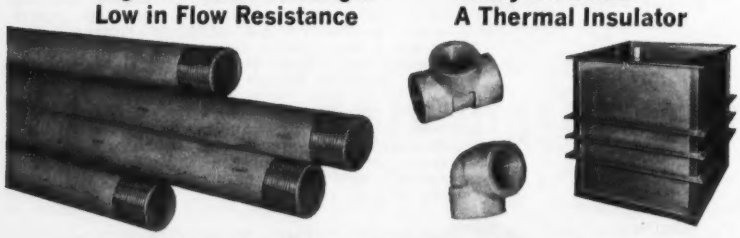

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INDUSTRIAL DIVISION OF . . .

COLONIAL PLASTICS MFG. CO.

Subsidiary of THE VAN DORN IRON WORKS CO.

2685 EAST 79TH STREET CLEVELAND 4, OHIO

Check 3950 opposite last page.

sium and 0-0.1% chromium. Fitting was a copper-free aluminum alloy.

Coincident with the conclusive results of foregoing test, a need arose to convert fans on two existing cooling towers from turbine to electrical drive. Test experience indicated advisability of aluminum conduit and copper-free aluminum fitting. Following basic needs were incorporated in the electrical design:

1) Electrical equipment located on the cooling towers was kept to a minimum. For example, motor starters and start-stop stations were located on the ground.

2) Each motor was served by a single conduit.

3) Conduit and safe-run switches were situated in areas exposed to as few cooling tower vapors as possible.

4) Conduit support was arranged to avoid physical proximity with a dissimilar metal.

Installation procedure was followed as closely as possible. Redwood, redwood-and-aluminum U-bolts, and redwood-and-aluminum one-hole conduit straps were used for conduit supports. Conduit fittings and switches were copper-free aluminum alloy: all exposed screws and parts of operating mechanisms were made of aluminum or stainless steel.

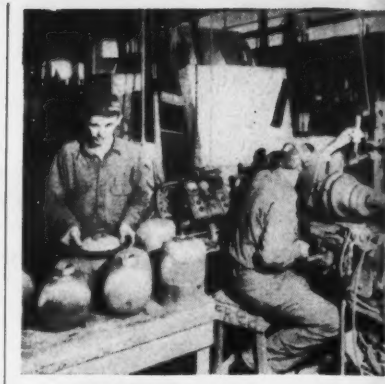
Installation Time Cut

Because of light weight and ease of handling and bending the aluminum, electricians completed the job in less than usual time for such an installation with a considerable saving in labor costs.

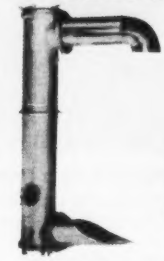
Results: After 2½ years of service, aluminum conduit and copper-free Condulet fittings on both cooling towers have shown no indication of corrosion despite the fact that no painting, taping, replacing or repair work has taken place during that time. All switches still operate freely.

(Copper-free aluminum Condulets are product of Crouse-Hinds Co., Syracuse, N. Y.)

Check 3951 opposite last page.



ONE SPECIAL UNIT . . . *or a million*



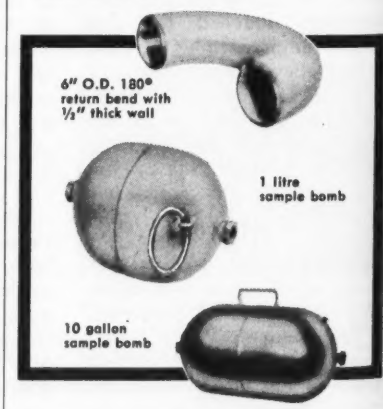
Vacuum pan heater

Requirements for special and standard stainless steel equipment in the chemical field vary widely in point of quantity and design.

That is why the unusual manufacturing and engineering versatility offered by A-P-C matches those requirements so perfectly.

A-P-C's widely experienced engineers are ready to take your ideas or your rough drawings and develop them into precisely the sanitary or corrosion-resistant equipment you want. Or A-P-C will work from *your* engineered drawings to make, literally, ONE UNIT OR A MILLION.

And A-P-C is amply qualified for it is an organization of craftsmen who work *exclusively* in stainless steel and other corrosion-resistant metals.



So, for perfection in craftsmanship, strict quality control, superior manufacturing techniques and ingenious engineering, call in the man from A-P-C.

ALLOY PRODUCTS CORP.

1075 Perkins Ave., Waukesha, Wisconsin

2047

Check 3952 opposite last page.

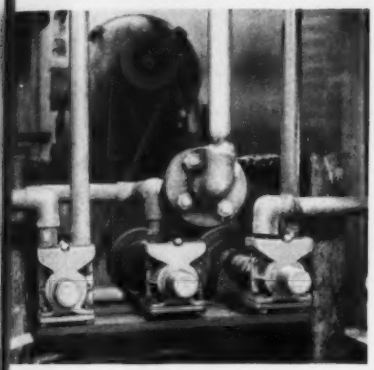
ECO ENGINEERING NEWS

the big name in small pumps for the process industries

Pumping Notes

•

Mallinckrodt Nuclear Corp. Gives ALL-CHEM Pumps Tough Job . . .



The battery of three ALL-CHEM Pumps shown above, driven by a single motor, is being used on a continuous, countercurrent extraction system. They are pumping tri-butyl-phosphate, kerosene and 3N nitric acid.

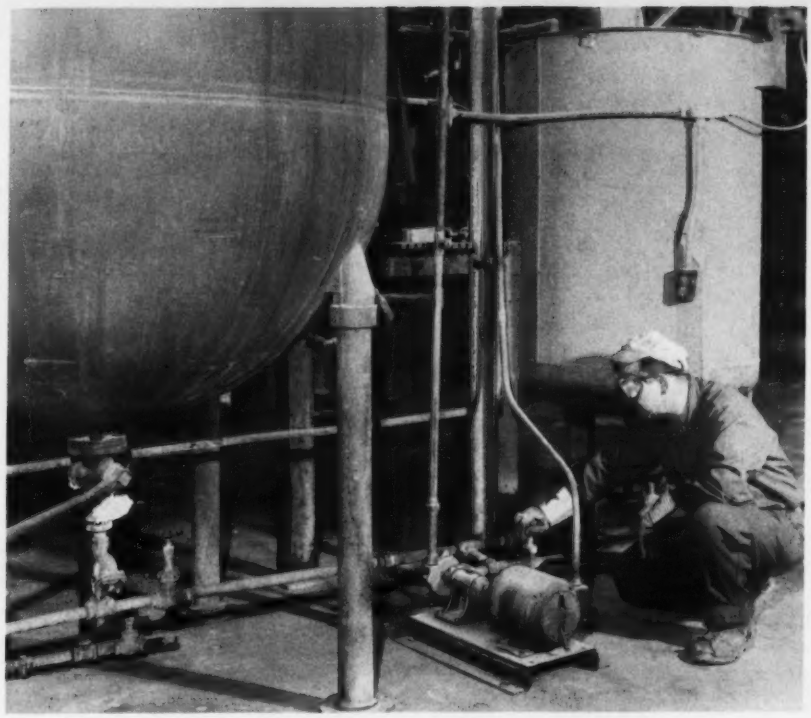
These ALL-CHEM Pumps are 304 stainless steel with Teflon† impellers and bearings and special Teflon and Halocarbon packing.

Though the nitric acid is extremely corrosive and the tri-butyl-phosphate is extremely hard to contain—these pumps and their packing are performing well on the job.

Eco Pumps Shown at Swiss Exposition

The ILMAC Exhibit recently held in Basle, Switzerland, is one of the most important held in Europe, pertaining to chemical equipment.

This official Eco Exhibit was conducted by our Swiss distributor, Mr. Henry C. Iseli.



CENTRI-CHEM Pump Provides Satisfaction to Largest Producer of Tin Chemicals

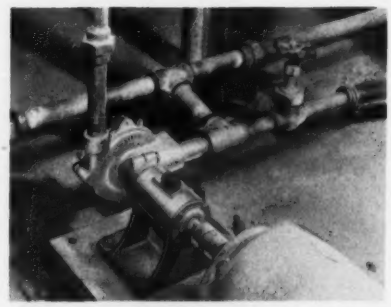
Metal and Thermit Corporation, Carteret, New Jersey, not only is the largest producer of tin chemicals in America—such chemicals as stannic chloride, stannous oxide, bismuth and barium stannates—but they also are engaged in the largest de-tinning operation from tin plate scrap in the country.

In these processing operations, it is obvious that some very difficult acids, caustics and slurries must be pumped.

In 1956 this company decided to try an Eco PTA-4 CENTRI-CHEM Pump for transfer of bismuth nitrate in excess nitric acid at ambient temperatures. This pump was also required to pump caustic solutions on occasions.

The CENTRI-CHEM Pump has now been continuously employed for three years on intermittent pumping service giving completely satisfactory operation. During these three years, only one basic repair has been required, which was the replacement of the mechanical seal.

Eco CENTRI-CHEM Pumps feature Type 20 stainless steel throughout—casings, shafts and impellers—which is the reason why they meet such a wide range of corrosive service.

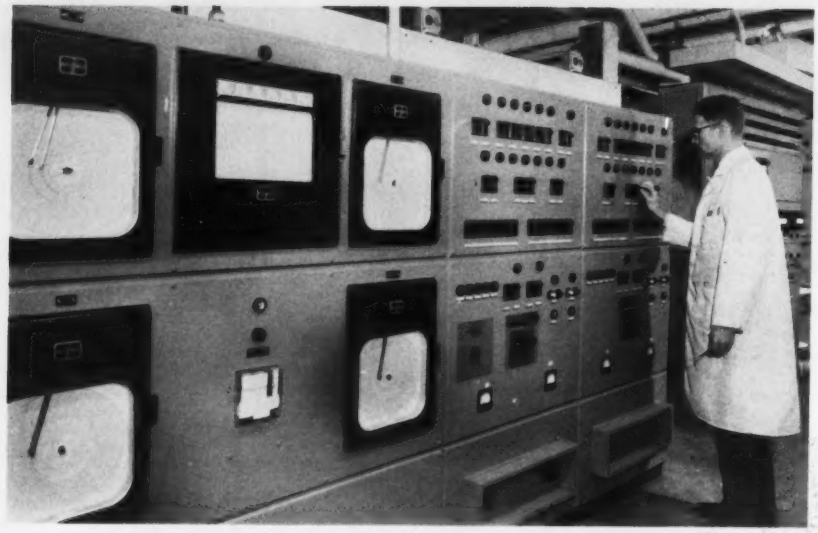


The mechanical seal used in CENTRI-CHEM Pumps has proven serviceable and leakproof within temperature ranges from minus 150°F to plus 450°F. It is simply constructed and easily maintained.

Seal components to meet various exposures include Teflon and ceramic, carbon and ceramic, and carbon and Type 20 Stainless or Stellite*. These components are dimensionally interchangeable.

*Union Carbide Trademark. †du Pont Trademark.

Eco Pumps Help Film Finisher Save $12,000 Worth of Silver, Annually



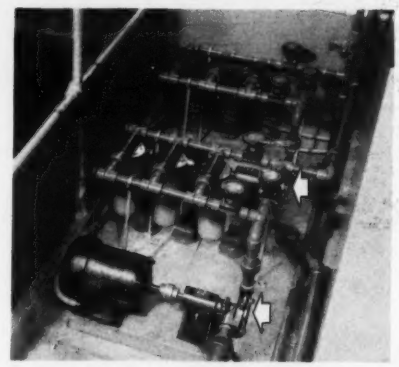
Control Engineer Spencer B. Fulweiler at one of the instrument panels from which all Film Finishing operations in this precision laboratory are controlled.

The Berkey Photo Service, Inc., with offices in New York, Boston, New Haven, Chicago and Detroit, is the largest independent color and black-and-white film finishing company in the world. More than 350 people are employed in the New York laboratory, alone.

For greatest efficiency this huge film finishing laboratory has been completely automated to insure exceptional quality control and maximum economy of operation.

For the reclamation of excess silver from the fixers, Berkey engineers, last May, installed a fixer recirculating system utilizing silver recovery cells and three Eco CENTRI-CHEM Pumps.

Two of these pumps have been in continuous service, 24 hours of the day, seven days of the week, since May 1959 without a single maintenance problem. The third pump is installed as a stand-by.



Two of the three Eco CENTRI-CHEM Pumps which recirculate the fixer through silver recovery cells.

Engineer Fulweiler who installed these pumps states that this silver recovery system is saving at the rate of $12,000.00 worth of silver annually.

ECO Products for Handling Corrosive and Hazardous Processing Fluids

ALL-CHEM® Rotary Pumps
MINILAB® Rotary Pumps
GEARCHEM® Gear Pumps
CENTRI-CHEM® Centrifugal Pumps
PUMPMOBILE® Portable Pumping Units
GEAR-VAC® Valves
CHEMICAL DISPENSING VALVES
Factory Mutual Approved

Ask for literature on any or all of these ECO Products

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The "Who Pumps What With Eco" Department

Example: Gesellschaft fur Angewaudte Chemie A. G., Baden, Switzerland, has operated an Eco ALL-CHEM Pump, 316 stainless steel construction with Teflon impellers, for the handling of phosphoric acid at room temperature, for two years. During this period, the pump has handled over 25 metric tons of this acid. The only repair required was one replacement of the Teflon impellers.

Example: Sylvania Corning Nuclear Corporation, Hicksville, L.I., New York, have repeatedly purchased Eco ALL-CHEM Pumps in 316 stainless steel with Teflon impellers, bearings and packing for handling hot nitric acid solutions at temperatures near 180°F.

Example: Radio Corporation of America, Lancaster, Pennsylvania, have purchased Eco Pumps for a number of years. These include both ALL-CHEM and GEARCHEM types for a variety of services covering caustics, acids, etc.

Example: Chesebrough-Ponds, Inc., Clinton, Connecticut, well known for Vaseline products and cosmetics, have operated a number of pedestal mounted CENTRI-CHEM Pumps as well as 316 stainless steel ALL-CHEM Pumps for several years. Media pumped range from lotions to solvents to emulsions, etc.

Tantalum, glassed steel combined in 14 sq ft heat exchanger

A shell-and-tube heat exchanger for highly corrosive service is made of tantalum with Glasteel bonnets. Design pressure is 75 psi and weight is 400 lb.

Exchanger has a carbon steel shell, 0.020″ thick tantalum tube sheet lining and 0.015″ tantalum tubes. Design of unit permitted savings in fabrication costs. Unit provides resistance to all acids except HF at elevated temperatures and to mild alkalis at moderate temperatures.

(Tantalum-Glasteel heat exchanger is product of The Pfaudler Co., div. of Pfaudler Permutit, Inc., Rochester, New York.)

Check 3953 opposite last page.

Coating acts as primer and topcoat

Uses: In the chemical, paper and petroleum industries.

Features: Only a single pass is required for complete corrosion control.

Description: Coating combines rust-inhibitive primer properties with the chemical resistance of a catalyzed epoxy. A single-pass spray coat provides a dry thickness up to 10 mils. Cost per mill foot barely exceeds one cent. Flash point is over 100°F.

(Primastic coating is product of Prufcoat Laboratories, Inc., 61 Main St., Cambridge, Massachusetts.)

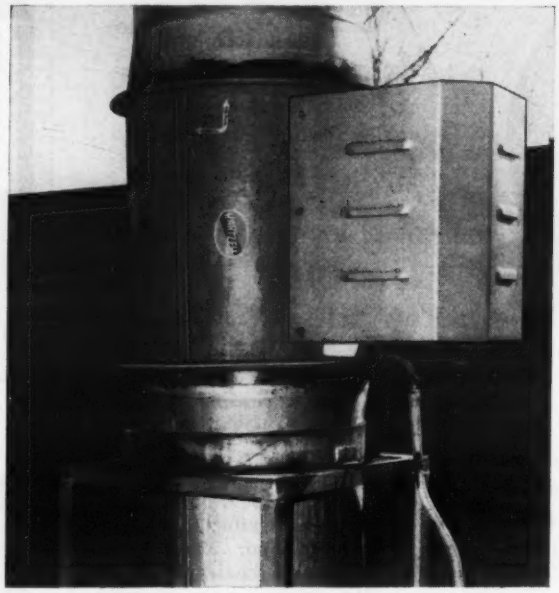
Check 3954 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

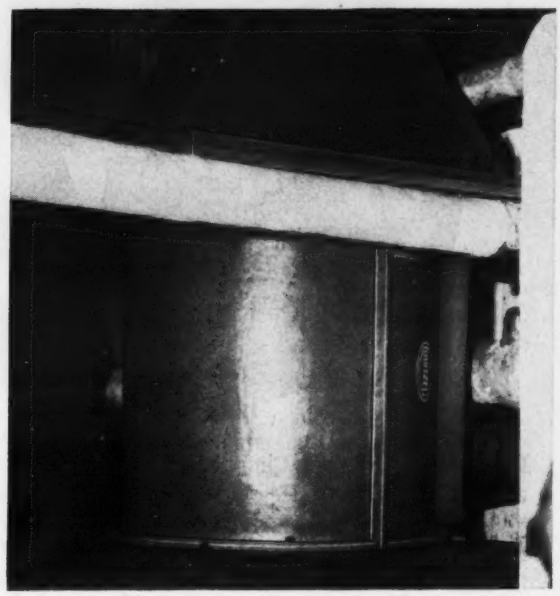
For more information on product at left, specify 3955 . . . see information request blank opposite last page.

NEW HARTZELL FIBERGLASS DUCT FANS OFFER UNSURPASSED RESISTANCE TO CORROSION

. . . and at a cost substantially below that of stainless steel or monel construction



At the Paramount Plating Company, Newark, N. J. this Hartzell fiberglass duct fan exhausts fumes from over a vat containing 90% phosphoric and 10% nitric acid at 180°-200°F. In use approximately 30 hours a week for well over a year, the fan is still as good as new. And corrosion damage within the plant has been sharply curtailed.



At the Verona Pharma Chemical Company, Newark, N. J. this Hartzell fiberglass duct fan draws fumes off a tank containing hydrochloric acid. Fan runs eight hours a day in conditions so corrosive that the motor has to be mounted outside the building, but it shows no signs of deterioration after nearly two years of service.

Corrosion resistance far above that which can be achieved with specially coated steels! Cost far below that of stainless steel or monel construction . . . and corrosion resistance which equals or exceeds that of stainless or monel!

That's the story in a nutshell on the new Hartzell fiberglass duct fan. (Propeller, duct section drive housing and bearing cover are fiberglass; drive shaft and bearings are stainless steel.)

And in design and performance these fans are identical to standard Hartzell belt-drive fans — same high efficiency, same exclusive features, including variable pitch drives which allow quick, easy adjustment of fan speed without removing the fan from the duct work. Hartzell fiberglass duct fans are now available in sizes 12″ to 36″ — 21 models in all. For details, call your nearby Hartzell field office or write for Bulletin A-116.

here's a complete line of air moving equipment designed and built specifically for industry

Other famous Hartzell products include controllable and full feathering propellers for light aircraft, crop drying equipment and farm ventilating fans.

HARTZELL PROPELLER FAN COMPANY • **65 Thomas Blvd. Piqua, Ohio**
Div. of Castle Hills Corp. A Member of AMCA Engineering Offices in Principal Cities

Check 3956 opposite last page.

This "heart-failure" can lengthen someone's life!

Pictured above is what happens when a pressure vessel protected by a BS&B Safety Head develops pressures above safe limits. "Heart" of the Safety Head is the rupture disc, which bursts to relieve the overpressure instantly and completely—guarding against injuries to personnel and damage to plant equipment.

BS&B Safety Heads

protect pressure systems in every type industry

Thousands of BS&B Safety Heads are today protecting millions of dollars worth of property and equipment and countless human lives. There's a BS&B Safety Head suitable for many types of pressure systems containing air, gas, steam or liquid.

BS&B Rupture Disc—"Heart" of the Safety Head

BS&B rupture discs are designed to relieve pressures at any specified point from 3 to 100,000 pounds per square inch. They are available in standard sizes ranging from ¼ inch to 36 inches in diameter, and in special sizes and types for virtually any application.

If you use any type of pressured system, let us tell you more about BS&B Safety Heads and rupture discs. Call or write your nearest BS&B office or representative—or write to . . .

BLACK, SIVALLS & BRYSON, INC.
Safety Head Division, Dept. 2-M3
7500 East 12th St.
Kansas City 26, Mo.

Check 3957 opposite last page.

CORROSION CONTROL

Exchanger for corrosives made of one piece of graphite

Uses: For limited volume heating or cooling.

Features: Heat exchanger is made of one piece of impervious graphite, in which both heating and cooling passages are drilled parallel to each other. Corrosives contract only the impervious graphite, which is unaffected.

Graphite exchanger is immune to thermal shock

Description: Exchanger consists of heat transfer section with header domes at each end. No shell is required. Temperatures to 340°F can be accommodated at pressures to 75 psig.

(Impervious graphite heat exchanger is product of Falls Industries, Inc., Aurora Road, Solon, Ohio.)

Check 3958 opposite last page.

". . . Faster!"

BRANSON

Ultrasonics at work . . .

CORROSION SURVEYS and FLAW DETECTION

AUDIGAGE® 6 — the new miniaturized, self-powered "mighty midget" Thickness Gage and Flaw Detector. Ideal for corrosion surveys by one man in awkward locations. Weighs less than 5 pounds complete. Uses new high-sensitivity, high-resolution **Type Z** transducers, flat or curved, in various mounts for every application. Measures directly in inches between 0.09" and 5.0". **BULLETIN A-201.**

AUDIGAGE® 5 — the standard self-powered instrument for field corrosion surveys when greater range or accuracy than Model 6 are required. **BULLETIN A-2.**

VIDIGAGE® 14 — the high-accuracy, high-speed, ultra-sensitive gage with a 14" CR tube. Range 0.005" to 2.7" with accuracies to 1/10 of 1%. Interchangeable oscillators and direct-reading scales. Extension cables and intercom phones for remote testing up to one-fifth mile from the basic instrument. **BULLETIN V-200.**

SONORAY® 5—the new portable, high-performance pulse-echo Flaw Detector for testing weldments, shafts, plates, etc., and detecting other internal flaws. Only 37 lbs., 7½" x 11" x 20¼" long. **BULLETIN T-203.**

Send Coupon to **BRANSON INSTRUMENTS, INC.**
51 Brown House Road, Stamford, Connecticut

BRANSON: Send Bulletin **A-201, A-2, V-200, T-203.**

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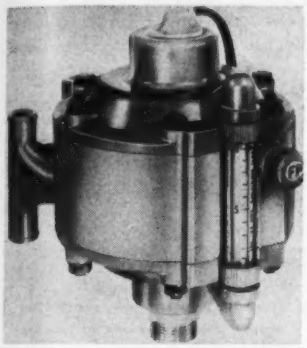
Check 3959 opposite last page.

Plastic gas dispenser mixes chlorine and water

Resistance to attack is one advantage of dispenser which serves as a metering device for mixing chlorine and water



Low maintenance is advantage of plastic gas dispenser

in predetermined ratios. Unit is molded in 13 pieces in polyvinyl chloride or Kralastic. Unit has but a single moving part.

Advantages are long service life, light weight, ease of assembly and original equipment economy.

(Gas dispenser is product of United States Gasket Company, Camden 1, N.J.)

Check 3960 opposite last page.

Platinum-plated titanium electrochemical anode does not corrode

Uses: For chlorine-caustic industry, cathodic protection, electroplating and control devices.

Features: Anode is maintenance free. It is not consumed during operation of cell.

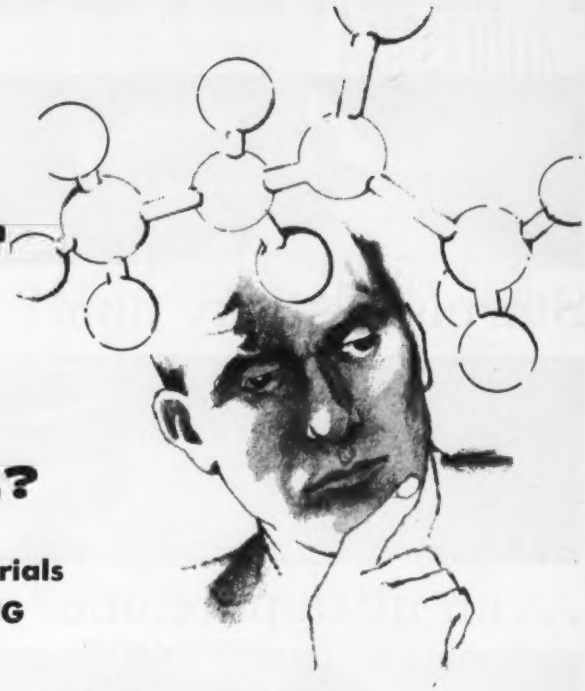
Description: Material for electrochemical anodes is titanium plated with a thin film of platinum. By coating the titanium with platinum, less than 0.0001" thick, titanium can be made to act like a solid platinum anode.

(Platinum-plated titanium is development of Crucible Steel Company of America, Oliver Building, Pittsburgh 22, Pa.)

Check 3961 opposite last page.

WANT TO IMPROVE YOUR PRODUCT?

LOOKING FOR A NEW RAW MATERIAL?



This month the Chemical Materials Section of CHEMICAL PROCESSING magazine begins on page 30

We feel sure you'll want to follow. . .

ISOPHTHALIC ACID'S ROAD TO SUCCESS

If you manufacture a product, and have successfully pinpointed potential markets through market research, how do you assure acceptance? Oronite Chemical Corp. developed a process for isophthalic acid. This compound promised a number of advantages to producers of resin coatings, reinforced plastic materials and polyurethane foams. Attractive markets indeed.

Then the hard facts of merchandising tossed a roadblock in the path of profit realization. Field sales stuttered, twitched, and refused to gain momentum. The reason . . . lack of application knowledge. Oronite's lab people had the knowledge . . . customers needed it.

The solution . . . form a complete marketing package including not only price and physical and chemical information, but practical "how to use it" suggestions.

For the complete story see "TEST TUBE TO PROFIT MAKER" in this issue of CHEMICAL PROCESSING magazine, beginning on page 30.

A TEFLON PROTECTIVE SKIN

Long sought after system for giving metal a pin-hole-free coating of teflon now appears established and Du Pont spent $19 million looking. CHEMICAL PROCESSING magazine's Chemical Materials Section unfolds the story of how "MOLDABLE TEFLON SMASHES APPLICATION BARRIERS" beginning on page 46 of this issue. Coatings are only one of many uses for this new form of chemically resistant, stable fluorocarbon resin. We know you'll want to see the full story.

CATALYSIS WITH ION EXCHANGE RESINS

Have you considered using ion exchange resins to replace acid catalysts? Epoxidation reactions lend themselves particularly well to this application and Reichhold Chemical Co., has found it advantageous.

It doesn't stop there, however. The same advantages Reichhold achieves can be equated to many other processes. We have outlined this growing field of ion exchange catalysis in the story "ION EXCHANGE CATALYSIS BENEFITS EPOXIDATION REACTIONS" beginning on page 32.

FLUIDICS* AT WORK

Storing a sticky fluid?

. . . an ultra-pure one?

. . . a harsh corrosive?

Glasteel thrives on solving problems like these

"Problem" storage is a primary area for the Glasteel storage tank.

If your product is sticky, Glasteel helps you overcome the cleaning problem. Because it's glass inside (steel outside), your Glasteel tank meets the product with a smooth, glossy surface unmatched by even the most highly finished metal or plastic. Your product has little place to cling or build up residue in a Glasteel tank.

If it is sensitively pure, your product will pick up no impurities from a Glasteel tank. Glass is inert. Never puts itself in the product. It protects the purity, flavor and aroma of whatever you store in it. That's why it should be no surprise to learn that Glasteel storage is a standard practice in the pharmaceutical industry.

If it's a corrosive, you can store your product safely in Glasteel. Glasteel is completely resistant to all acids (except hydrofluoric) and to alkalies at ambient temperatures.

Save money two ways

The profit return with Glasteel storage tanks is reflected in two ways:
1. In tanks of 10,000 gallons and more, Glasteel is actually lower in price than stainless steel. In the 30,000 gallon range they cost half as much. These savings are immediate.
2. In tanks of *any* size you save money when storing corrosives, because Glasteel tanks last 20 years and more, require little maintenance.

More? Our Bulletin 975 contains additional economic facts plus specifications. Write Pfaudler Permutit Canada Ltd., Ideal Welding Division, Toronto, or our Pfaudler Division, Dept. CP-30, Rochester 3, New York, U. S. A.

PFAUDLER PERMUTIT INC.
Specialists in FLUIDICS . . . the science of fluid processes

Check 3963 opposite last page.

Look what's happened to the "refractory metals"!

Today you can get a variety of corrosion-resistant equipment in tantalum, titanium and zirconium.

These are the so-called "refractory metals" which defied commercial fabrication for many years, since they can't be welded in the presence of oxygen.

Solid ZIRCONIUM burner for dilute acid generation.

But Pfaudler has developed special equipment and techniques to change them into the "wonder metals"—ready to work for you in a variety of designs and applications.

Tantalum has virtually zero corrosion rate in most corrosives at concentrations and temperatures normally encountered in the process industries. It has most of the same inert characteristics as Glasteel.

Titanium, recommended particularly for handling chlorides or strong oxidizing agents, gives you resistance to more highly concentrated solutions at much higher temperatures than possible with stainless steel.

Zirconium has many specialized corrosion resistance areas such as hydrochloric acid and alkalies at all concentrations – even including fused caustic.

You can get these metals fabricated in solid or lined vessels to several thousand gallons, heat exchangers, columns, accessories and custom designed equipment. Tantalum is also offered in a standard line of bayonet heaters.

Our Bulletin 978 is a good place to start exploring the improvements you can make with these metals. We'll be glad to send you a copy.

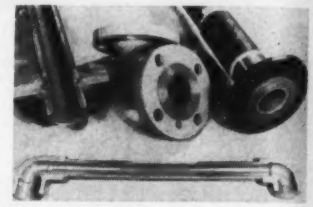
*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment, and experience in solving problems involving fluids.

Penton-lined pipe handles hot corrosives

Uses: For use in piping corrosives, solvents, high-pressure steam, other products.

Features: Temperatures up to about 280°F can be withstood.

Description: Piping is lined with the injection-molded


Pipe and fittings lined with corrosion-resistant polyether plastic

chlorinated polyether plastic, known as Penton. Both Penton-lined and all-Penton fittings are available. Both carbon steel and aluminum piping will be lined.

(Penton-lined pipe and fittings are the product of Tube Turns Plastics, Inc., 2929 Magazine St., Louisville 11, Kentucky.)

Check 3964 opposite last page.

Oils, greases and acids resisted by wiring devices

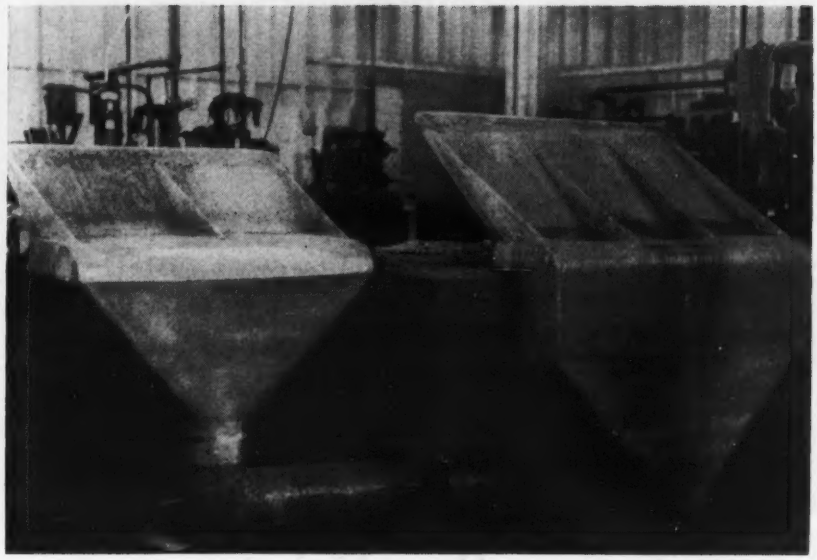
Uses: For wiring installations that have to stand up under vapors, acids, live steam and other corrosive conditions.

Features: Products are made of a variety of corrosion-resistant materials. For example, Insulprene and Melamine insulations are used. Monel and nickel-plated brass are also utilized.

Description: Connection devices and three-wire grounding receptacles are included in line: A combination plate and switch that operates while completely enclosed is available.

(Chem Marine wiring devices are product of Harvey Hubbell, Inc., Bridgeport 2, Conn.)

Check 3965 opposite last page.



Polyester-resin plastic ducts withstand hot HCl fumes

Show no evidence of corrosion after a year of service

PROBLEM: Coated metal ducts formerly used for handling corrosive fumes from molten tin at Canada Wire and Cable Company, Ltd., lasted only three years before failure. Ducts were in service on tinning machines at the plant. Ducts were subjected to heat as well as corrosive, toxic fumes.

Solution: Four pairs of ducts fabricated from Hetron® polyester resins were installed on the tinning machines. Two of the ducts are shown in photograph.

Duct on right side in photo is over a tinning bath and receives hot fumes from this operation. Also, there is an open flame within two inches of this duct, which made fire resistance a must for this application. Duct on left side draws heated corrosive fumes from a muriatic bath.

Corrosive fumes pass through the primary hoods and into a ductwork also fabricated from polyester resins. Fumes then enter a manifold and pass out a glass fiber-reinforced polyester resin stack.

Plastic ducts were made by the technique of throw-away tooling. Since smoothness of outside surface was not important for this application it was left fairly rough enabling costs to be cut to a minimum. Since ductwork can be cut with a saw and rejoined on the job, installation was simplified.

Results: Polyester resin ducts show no evidence of breakdown after nearly a year of operation under the severe conditions. Painting and maintenance problems have been eliminated.

(Hetron polyester resins are product of Durez Plastics Division, Hooker Chemical Corporation, Niagara Falls, N.Y.)

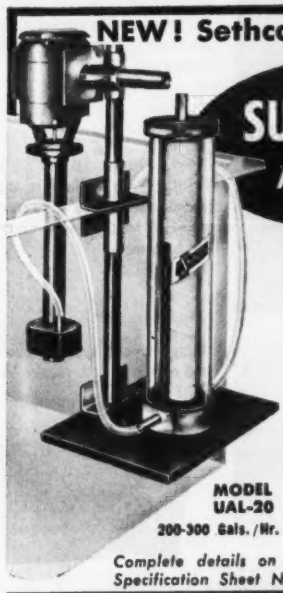
Check 3966 opposite last page.

(Ducts were fabricated by Polyrein Div., Leavens Bros., Ltd.)

new Koncentrik® Stainless
PIPE UNIONS HAVE A Fully Confined TEFLON SEAL
Exclusive design is ideal for high pressure and high vacuum applications. Pressure ratings — 2,000#, 3,000#, 4,000# and 6,000#. Screwed or socket weld ends, for pipe sizes ⅛" to 2". Write for catalog today.
Fully Confined
THE SPECIAL SCREW PRODUCTS COMPANY
Bedford, Ohio
SSP

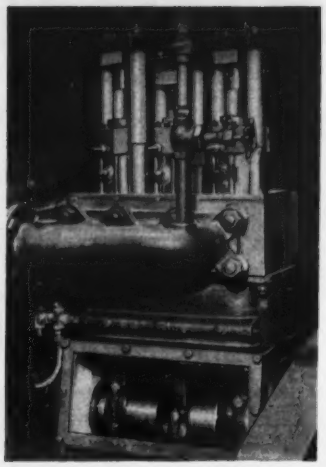
Check 3967 opposite last page.

NEW! Sethco corrosion proof
SUMP PUMP AND FILTER
handles all acid, alkaline solutions and solvents up to 250°
Self - priming, leakproof Epoxy sump pump provides continuous duty performance. Bracketed inside the tank, it requires no floor space. Outside bracket supports High Temp. Lucite or Epoxy filter chamber . . . resistant to all corrosive solutions and solvents. ½ or ¾ HP motor. Pump and filter chambers are available separately.
MODEL UAL-20
200-300 Gals./Hr.
Complete details on Sethco Specification Sheet No. 751
WRITE for NEW illustrated 8 Page Brochure . . . complete line of SETHCO FILTER PUMP UNITS (50 to 2700 Gals./Hr) providing Depth Filtration for all chemical applications. Includes special informative 'Filter Pump Selection Guide'
Sethco
MAyfair 3-4220
2287 BABYLON TURNPIKE, MERRICK, L. I., NEW YORK



Check 3968 opposite last page.

Colmonoy Protected Plunger Outlasts Other Two in Triplex Pump Test

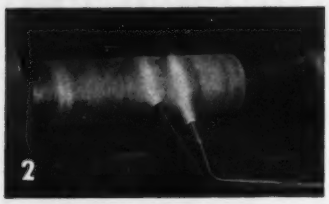


A Colmonoy hard-surfaced pump plunger was operated along with two other standard plungers in a four-month test by Cardinal Chemical Co. After pumping 748,524 gallons of acid, oil, and various sand-laden fluids, the Colmonoy surfaced plunger showed no signs of wear whatsoever. The two unprotected plungers suffered severe wear, having almost reached the limit of their usefulness. Discover for yourself how Colmonoy hard-surfacing extends equipment life, reduces down-time and maintenance costs.

Applying Colmonoy Sprayweld Hard-Surfacing:*

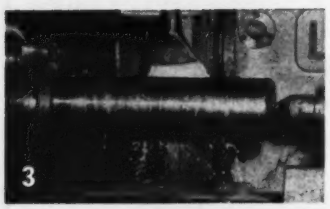
1

Plunger is prepared for spraying by undercutting and grit blasting. The Colmonoy Sprayweld sprays powdered Colmonoy alloy on the turning part.



2

The Colmonoy surface is then heated to about 1900° F. to create a welded bond between overlay and base metal.



3

Sprayweld overlays are smooth and evenly applied, require little finish grinding.

Ask for the Sprayweld Catalog and Colmonoy Hard-Surfacing Manual No. 79.

*Registered trade-mark

HARD-SURFACING AND BRAZING ALLOYS

WALL COLMONOY CORPORATION

19345 John R Street • Detroit 3, Michigan

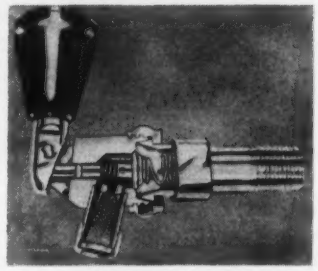
BIRMINGHAM • BUFFALO • CHICAGO • HOUSTON • LOS ANGELES
MORRISVILLE, PA. • NEW YORK • PITTSBURGH • MONTREAL • GREAT BRITAIN

Check 3969 opposite last page.

Titanium-Teflon valve handles fuming nitric acid

Uses: Dispensing, draining, and sampling service in atomic energy, electronic and chemical industry applications.

Features: Dispensing valve will handle such products as white fuming nitric acid, chlorine solutions, chlorinated organic compounds and nitric-sulfuric acid mixtures.



Nitric-sulfuric acid is not too tough for titanium-Teflon dispensing valve

Description: Titanium valve has fume-tight design, with spring-loaded Teflon seals. Unit has instant, positive shut-off. After-drip or leakage is eliminated.

(Titanium-Teflon dispensing valve is product of Eco Engineering Company, 12 New York Ave., Newark, N. J.)

Check 3970 opposite last page.

Glass heat exchanger has 60 sq ft capacity

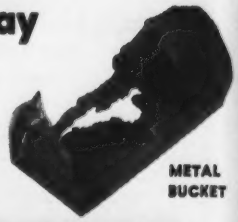
Design changes make units more durable

Uses: For cooling and regenerative service processing corrosive fluids.

Features: Unit available with 60 sq ft capacity incorporates changes based on operating experience in chemical plants. These improvements make units more reliable and durable.

Description: Standard units have a steel shell and are engineered for cooling operations. Units designed for regenerative service are jacketed in hard, low-expansion borosilicate glass which is re-

Most chemicals won't eat away or cake-up in Dura-Bukets*



*Seamless high-speed, lightweight elevator buckets of special impact-resistant reinforced phenolic by Fiberite Corp.

On chemical product elevator legs . . . where ordinary metal buckets corrode to uselessness in weeks . . . DURA-BUKETS resist chemical reaction and continue in service for years. DURA-BUKETS elevate a full payload on each pass over the head pulley because they don't cake-up. Self-cleaning DURA-BUKETS are more sanitary, too. The spark and static proof quality of DURA-BUKETS makes them perfect for elevating dusty or flammable materials.

DURA-BUKETS don't eat up profits . . . they elevate them. With DURA-BUKETS you can slash replacement costs and down time. WRITE FOR DETAILS AND PRICES.

Dura-Buket DIVISION OF
NATIONAL OATS CO. • EAST ST. LOUIS, ILLINOIS

Check 3971 opposite last page.

STOPS LEAKS PERMANENTLY: prove it at our expense!

Use *Leak Lock* to seal thread and flange joints...to keep bolts, nuts and plugs from loosening under the most rigorous usage. It's been job-proved in thousands of applications to give these advantages...

- Withstands solvents that eat away other joint compounds.
- Remains flexible indefinitely ...joints won't freeze.
- Gives a tight seal under a wide range of temperatures, pressures.
- Does *not* heat spontaneously.
- Is unaffected by oil, gasoline, refrigerants, most gases and chemicals.
- Makes work easier... flows on and stays where applied.

Listed by Underwriters' Laboratories for gas, oil, propane and butane equipment.

FREE SAMPLE—*Leak Lock* is available in handy tubes and in cans. Write on your letterhead for sample tube.

HIGHSIDE CHEMICALS INCORPORATED
16 Colfax Avenue • Clifton, New Jersey

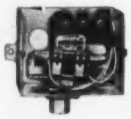
Check 3972 opposite last page.

MERCOID®
CONTROLS
NEW CATALOG AVAILABLE

Write for your copy

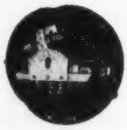
Controls for—
- PRESSURE
- TEMPERATURE
- LIQUID LEVEL
- MERCURY SWITCHES
- TRANSFORMER-RELAYS

CHECK THESE NEW PRODUCTS BY MERCOID



TYPE AP-153

New SP-DT low pressure (instrument air) control. Small in size, light in weight. Provides any of following operations: SP cut-in high; SP cut-in low; or SP-DT operation. Two operating ranges 1 to 20 and 1 to 30 psig. External adjustments, visible dial and visible circuit position. See catalog No. 860



TYPE PG

New low pressure diaphragm control for gases or air. Can be used three ways; for pressure, negative (vac.) pressure or differential pressure. External adjustments, visible dial and visible on-off circuit position. Two operating ranges, 1.0" to 30.0" and 1/2 to 5 psig. See catalog No. 860

ASK FOR CATALOG NO. 860

THE MERCOID CORPORATION
4211 Belmont Ave., Chicago 41, Ill.

Check 3973 opposite last page.

sistant to heat, shock and corrosion.

Exchanger contains bundle of 31 Pyrex-brand glass tubes, ¾" in diameter. Unit can take operating temperature of 200°F on shell side and 375°F on tube side. Working pressure can be as high as 20 psi.

(Pyrex brand heat exchanger is product of Corning Glass Works, Corning, N.Y.)

Check 3974 opposite last page.

Nickel alloy steels have 250,000 psi yield strength

Recently developed nickel alloy steels, known as 25% nickel steels, provide yield strength in excess of 250,000 psi. In some cases yield strength of 290,000 has been achieved.

Many of steels possess excellent cold-forming characteristics after a simple annealing treatment. Ready workability, wear resistance, weld-ability and other good mechanical properties make steels of value for a variety of applications.

(For information on 25% nickel steels contact The International Nickel Company, Inc., 67 Wall Street, New York 5, N.Y.)

Check 3975 opposite last page.

"Alright—Just one more, then I must get one of the valve, gentlemen!"

Life in these excited states...

"We've been having trouble with corrosion in this section."

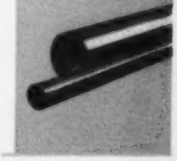
KEN GOYEA

Corrosion is embarrassing

It's *expensive*, too. Not only in terms of equipment chewed up, but also in un-timely time losses and wasted ingredients. You save embarrassment and expense *both* with Ace chemical resistant piping, valves, pumps, tanks, and special lined equipment. 108 years' experience at your service.

RIVICLOR for ageless strength

All-purpose rigid PVC. Sched. 40, 80 & 120, ½ to 4". Threaded or socket-weld fittings. Valves ½ to 2". NSF-approved. *Bul. CE-56.*



NEW ACE Gear Pump

Improved design . . . now 12 gpm. All wetted parts acid-resistant, wear-resistant Ace hard rubber. Finest available. *Bul. CE-55.*

SUPPLEX tops in economy

Flexible poly pipe, ideal for water lines, drains, underground pipe or conduit. Sizes ½ to 2", long coils, NSF-approved for drinking water. *Bul. CE-57.*

VALVE HEADQUARTERS

World's best chemical valves . . . at moderate prices. All-plastic, rubber-lined, or all-hard-rubber. ⅛" pet cocks to 24" gate valves.

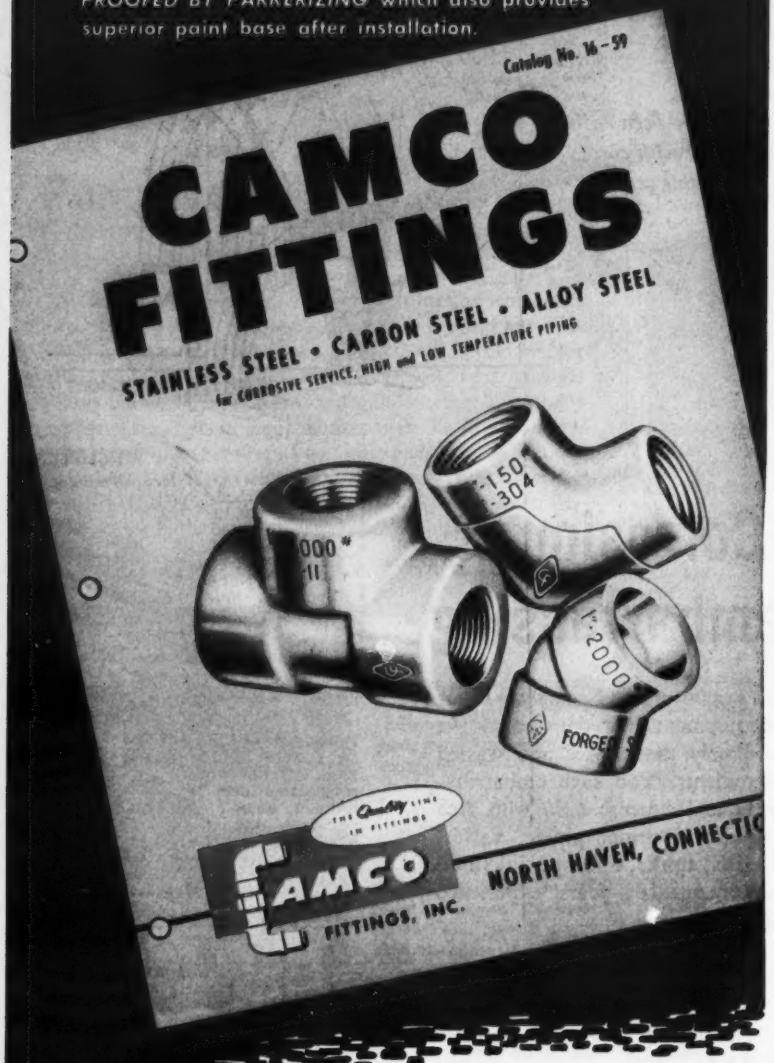
ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

Check 3976 opposite last page.

now available...

FORGED STEEL screwed and socketweld pipe fittings (2000# thru 6000# rating) with all surfaces *RUST PROOFED BY PARKERIZING* which also provides superior paint base after installation.



A complete line of *STAINLESS STEEL* fittings in all pressure ratings from 150# thru 6000#.

Free
FILL IN AND MAIL TODAY!

CP

CAMCO FITTINGS, INC.
North Haven, Connecticut

☐ Catalog covering complete line.
☐ Furnish address of area distributer.

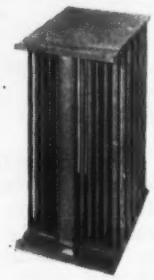
Name .....
Company .....
Address .....
City ..... State .....

Check 3977 opposite last page.

Entrainment separator made of impervious graphite

Corrosive gases can be handled by entrainment separator composed of modules made of impervious graphite. Designed for high collection efficiency and low pressure drop, the modules measure one by two feet.

Entrainment separator modules are of unitized construction, and operate on the principle of impingement plus venturi action. Staggered rows of tear-drop-shaped Karbate impervious graphite rods are cemented in place with a minimum of ¼" clearance to minimize clogging. Staggered arrangement prevents straight-through flow, and open diagonal lanes permit easy cleaning when necessary. Streamlined rod shape retards re-entrainment and minimizes resistance to gas flow.



Modules like this are assembled into banks to fit duct or process vessel

(Type MV entrainment separator is product of National Carbon Company, Div. of Union Carbide Corporation, 535 Fifth Ave., New York 17, N.Y.)

Check 3978 opposite last page.

Vanadium tubing successfully extruded

Announcement is made of successful extrusion of commercially pure vanadium tubing. Seamless vanadium tubing will be particularly valuable in nuclear and process industries because of light weight, high-temperature

INSTALLATION
- COSTS LESS
- EASIER • SIMPLER
- SPACE SAVING

CLOSURE
- POSITIVE
- DROP-TIGHT
- FASTER

ROCKWELL
Resilient-Seated
BUTTERFLY VALVES

ENGINEERING FACTS

For control of air, gases or process fluids Rockwell Wafer Butterfly Valves give you these installation, service and maintenance advantages not found in other types:

1—Narrower body, less length and simpler construction—make valve lighter, easier to install in less space at lower overall cost.

2—Equalized pressure on valve disc makes opening and closing simple. Minimum pressure drop.

3—Rubber, Neoprene, Hycar, Viton or other resilient synthetic seat forms positive drop-tight seal on shut off and a tight gasket seal between valve and pipe flanges. The "Keelok" seat is easily removable.

4—No fouling—no clogging—valve is self-cleaning.

5—Valve may be operated manually or by automatic remote control. Sizes—from 2" to 48".

Write for Bulletin 583.

W. S. ROCKWELL COMPANY
2200 Eliot St. • Fairfield, Conn.

Check 3979 opposite last page.

strength and corrosion resistance of metal.

Vanadium has excellent resistance to hydrochloric and sulfuric acid and withstands attack by salt water. Thermal conductivity is good. It is believed that use of vanadium as a jacketing material in sodium-cooled nuclear reactors might permit raising operating temperature limit of such reactors by nearly 600°F.

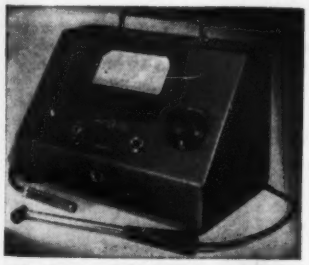
Cost of vanadium is currently $35/lb.

(For further information on vanadium tubing contact Wolverine Tube Div., Calumet & Hecla, Inc., 17200 Southfield Rd., Allen Park, Michigan.)

Check 3980 opposite last page.

Coating thickness measured quickly, accurately

Uses: In addition to measuring thickness of metallic and non-metallic coatings on any dissimilar bases, unit will also



Thickness gage works on eddy-current principle

compare hardness and grades of metals and other materials.

Features: Coatings of any type and thickness can be measured quickly and accurately with unit.

Description: Electric micro-gage and comparator operates on the eddy-current principle. It makes use of fact that electrical characteristics of coil are influenced in proportion to conductivity of materials being measured.

(Elecotector thickness gage is available from Supply Div., Ferro Corporation, 4150 East 56 Street, Cleveland 5, Ohio.)

Check 3981 opposite last page.

SEE WHAT

PENTON*

TANK LININGS CAN DO

A 40-mil Penton lining was applied to all of the interior surfaces of this separator tank, using a straightforward adhesive system and conventional welding techniques. The tank is designed to serve as a decanter in the separation of carbon tetrachloride from weak hydrochloric acid with dissolved nascent chlorine.

In operation in processing system in a large East Coast chemical plant, this Penton-lined tank has successfully met all service requirements since its installation. Tanks for plating solutions, chemical milling operations, and the storage and handling of other corrosive fluids at elevated temperatures are typical of the many new uses where Penton linings are now proving their ability to outperform other materials in their class.

Lined by Electro-Chemical Engineering and Manufacturing Company with Penton sheet manufactured by National Vulcanized Fiber Co.

Penton linings readily convert carbon steel tanks into vessels capable of handling highly corrosive fluids at elevated temperatures. The ability of Penton linings to upgrade low-cost metal substrates in chemical processing systems has led to their widespread use in many areas where only high-cost materials were previously qualified to serve.

Linings made with this new thermoplastic are applied by the use of a straightforward adhesive system and conventional gas welding techniques. They provide a highly practical means of supplying the superior corrosion resistance offered by Penton to vessels in a wide range of shapes and sizes.

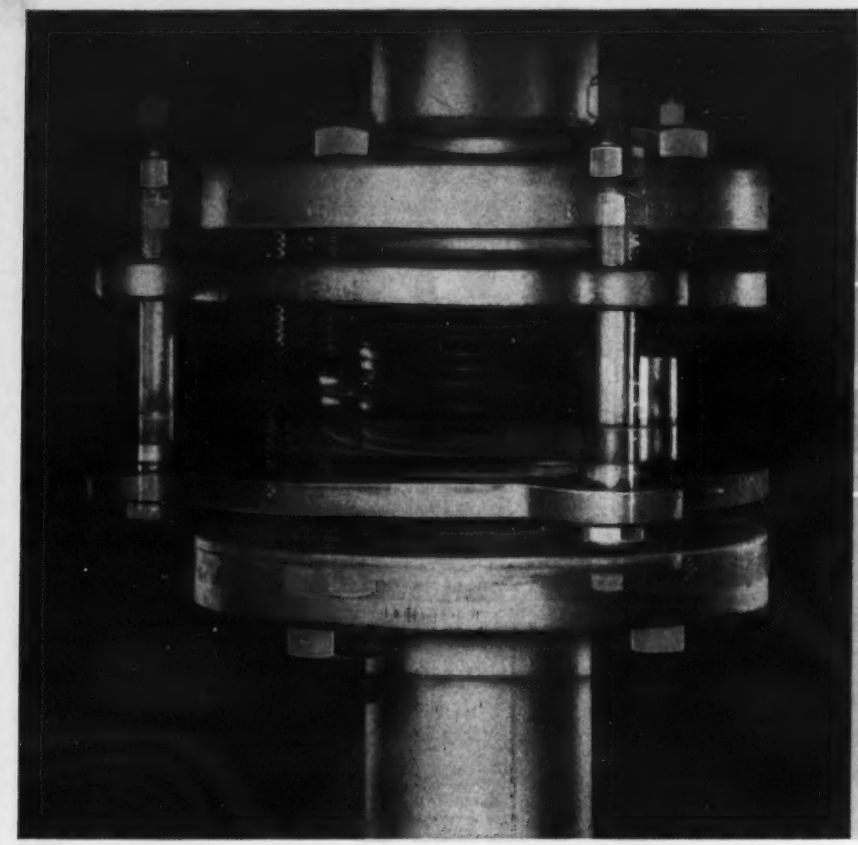
Find out how Penton tank linings may provide the answer to your chemical storage or handling problem. For additional information on materials and application techniques, and a current list of fabricators, call or write:

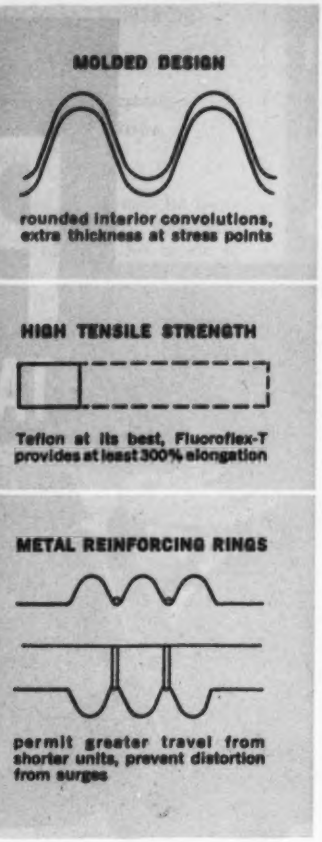
HERCULES POWDER COMPANY
INCORPORATED
Wilmington 99, Delaware

*Hercules registered trade mark for chlorinated polyether.

CP60-5

Check 3982 opposite last page.




MOLDED DESIGN
rounded interior convolutions, extra thickness at stress points
HIGH TENSILE STRENGTH
Teflon at its best, Fluoroflex-T provides at least 300% elongation
METAL REINFORCING RINGS
permit greater travel from shorter units, prevent distortion from surges

2 MILLION CYCLES AND STILL FLEXING!

...proving that this Teflon expansion joint—molded of Fluoroflex-T —outlasts most other materials and constructions

Chemical manufacturer: Tried Fluoroflex®-T joint, found it *still* flexing after *2 million cycles;* previously had averaged 100,000 cycles from machined Teflon® flex joint in pumping application.

Major industrial product company: Displaced one end of a special Fluoroflex-T bellows ¾-inch from its axis, rotated it around axis at 1,000 rpm. After *20 million cycles,* with still no sign of deterioration, test discontinued.

Petrochemical processor: Installed Fluoroflex-T joints to replace joints machined from Teflon. The Fluoroflex-T joints are still in service after nearly a year.

Fluoroflex-T flex and expansion joints perform so much better for three reasons: (1) *The material:* a patented compound of Teflon that combines high density with low crystallinity for optimum strength and flexibility. (2) *The process:* a unique technique for molding uniform convolutions with restraining rings. This gives undamaged grain structure, rounded interior convolutions and increased strength. (3) *The experience:* Resistoflex has been working with fluorocarbon resins since their inception. For fabricating with Teflon, such experience is *vital.* That's why Fluoroflex-T is Teflon at its best.

So, for corrosion-proof flex and expansion joints that give unsurpassed working life, specify Fluoroflex-T. Write for Bulletin B-1A. Dept. 300, RESISTOFLEX CORPORATION, Roseland, N. J. Other Plants: Burbank, Calif.; Dallas, Tex.

®Fluoroflex is a Resistoflex trademark, reg., U. S. pat. off.
®Teflon is DuPont's trademark for TFE fluorocarbon resins.

Complete systems for corrosive service

RESISTOFLEX

Check 3983 opposite last page.

CORROSION CONTROL

Two coating systems simplify control of corrosion

One of two recently developed coating systems is a coating based on chlorinated rubber. It can be used for exposures to sulfuric acid of 75% of concentration or higher, nitric acid and phosphoric acid. A three-coat application may be applied in a little over four hours.

Second coating system is an epoxy designed for exposure to such solvents as ketones, esters and alcohol ethers.

(Chlorinated rubber and epoxy coating systems are development of Truscon Laboratories, Division of Devoe and Raynolds Co., 1700 Caniff Ave., Detroit 12, Michigan)

Check 3984 opposite last page.

NEW LITERATURE
Corrosion Control

Self-curing zinc coating that can be applied in a single coat to provide protection from water, severe weathering, salt spray and abrasions is described in two-page bulletin. Coating is unaffected by solvents and is not flammable, volatile or toxic. "Zinkote" — Amercoat Corporation.

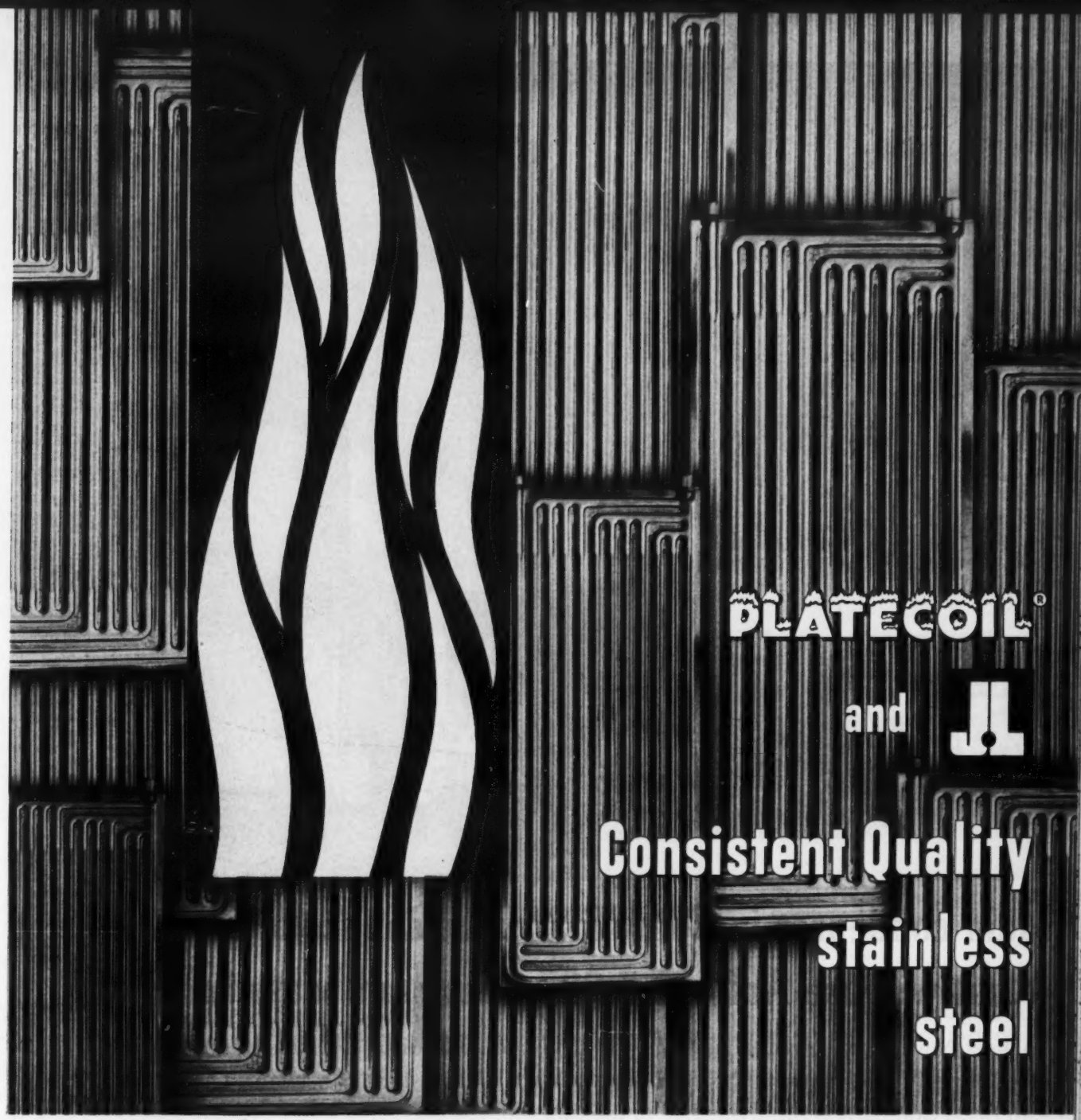
Check 3985 opposite last page.

Corrosion resistance of molybdenum and molybdenum-base alloys, which are going into more and more equipment in the chemical processing industries, is discussed in detail in 24-page technical bulletin. Resistance of molybdenum to a large number of chemicals is given. "Molybdenum Metal" — Climax Molybdenum Company, Div. of American Metal Climax, Inc.

Check 3986 opposite last page.

Lead-surfaced base metals are discussed in detail in 16-page brochure. Among metals being clad with lead are aluminum, copper, carbon steel, stainless steel and stainless clad steel. These products are used to shield against corrosives, radioactive corrosives or radiation in a variety of applications. "The Insmetals" — Knapp Mills, Incorporated.

Check 3987 opposite last page.



Maintaining a constant temperature of 70 to 72° F in a 16⅔% sulfuric acid solution is an ideal application for Platecoil... typical of many engineered by Tranter Manufacturing inc., Lansing, Michigan.

Corrosive environments dictate the use of stainless steel, Tranter's rigid production requirements dictate the use of J&L Consistent Quality stainless steel.

Why J&L? Here's the reason given by Mr. M. C. Nolen, Tranter Purchasing Agent:

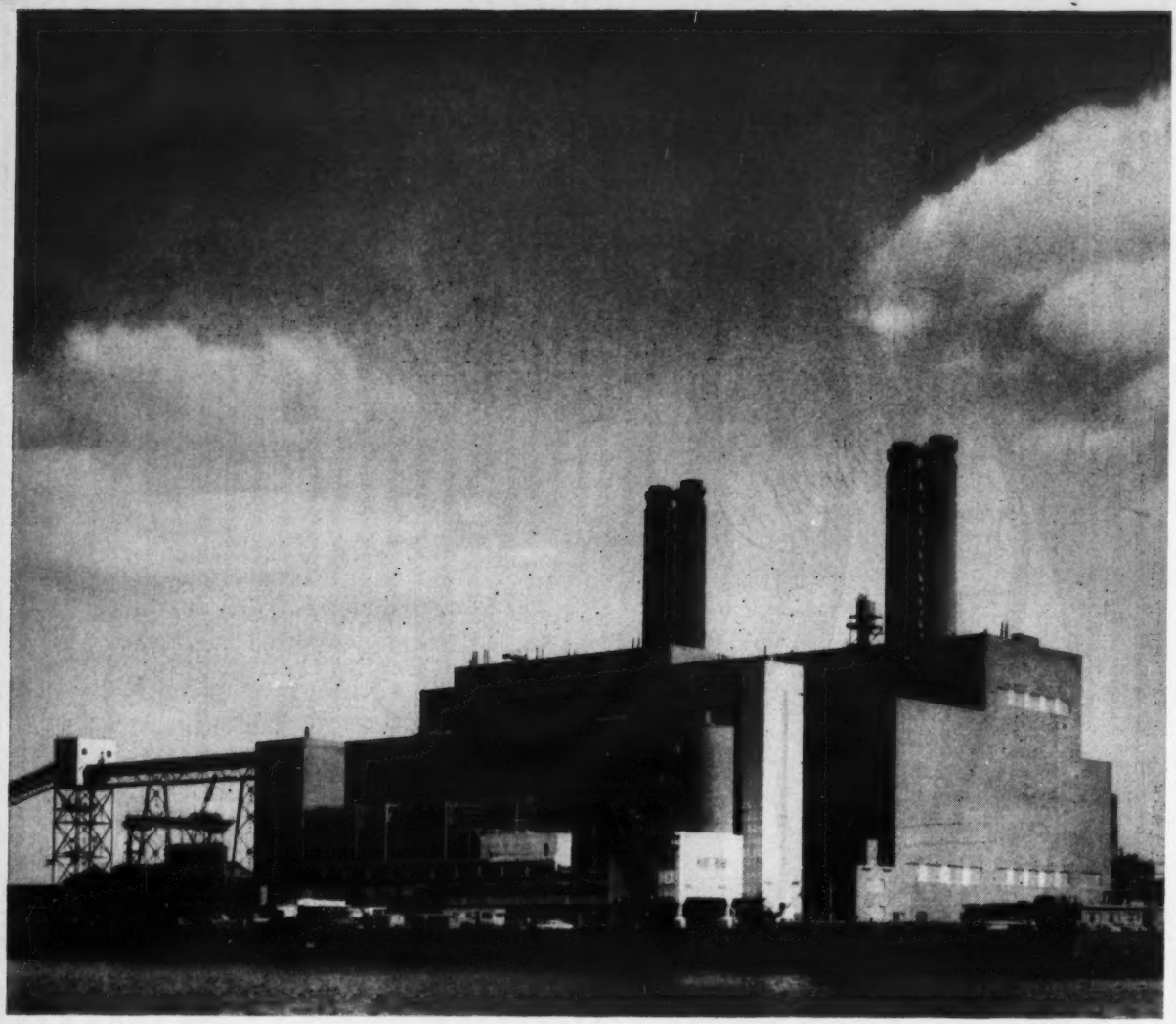
> "Tranter uses J&L stainless because of its uniform quality. It takes all the headaches out of raw materials and makes our job a matter of just processing this superior product."

For more information on product at right, specify 3988 see information request blank opposite last page.

Plants and Service Centers:
Los Angeles • Kenilworth (N. J.) • Youngstown • Louisville (Ohio) • Indianapolis • Detroit

J&L STAINLESS
SHEET • STRIP • BAR • WIRE

Jones & Laughlin Steel Corporation • STAINLESS and STRIP DIVISION • DETROIT 34



Main condenser in Consolidated Edison Astoria No. 4 Unit will use Ambraloy-927 aluminum brass tubes

To meet New York's growing power needs, Consolidated Edison Co. adds a 340,000-kw block of generating capacity this year, when it starts up its Astoria No. 4 Unit. The American Brass Company is supplying half of the tubes for the main condenser—12,250 tubes, each ⅞" O.D. x .049" wall, of Ambraloy-927. This aluminum brass condenser tube alloy was developed by Anaconda to provide high corrosion resistance to clean and polluted sea water. It has established an excellent service record in steam power plants and oil refineries along the seacoasts—and in marine service on high-speed turbine-driven vessels. The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario. 6064

ANACONDA®

TUBES AND PLATES FOR CONDENSERS AND HEAT EXCHANGERS

Made by The American Brass Company

Check 3989 opposite last page.

CORROSION CONTROL

Titanium technical brochure of 57 pages tells how the metal can be used to the greatest advantage in the chemical processing industries. Information is given on why to use titanium, how to specify titanium equipment, where to use titanium and where not to use titanium. "Titanium" — Crucible Steel Company of America.

Check 3990 opposite last page.

Flooring guide give information on maintenance, repair, patching and resurfacing of interior and exterior floors for a variety of severe conditions. About 30 floor materials are described. "Flooring Guide" can be obtained on letterhead request from Flooring Div., The Monroe Co., Inc., 10703 Quebec Ave., Cleveland 6, Ohio.

Corrosion-resistant pipe, spargers, and thermowells and nozzle liners for high temperature applications are described in four-page bulletin. Products are lined and jacketed with a tetrafluoroethylene compound and internally reinforced with steel. Bul DS-1 — Resistoflex Corporation.

Check 3991 opposite last page.

Rotameters for corrosive applications are covered in eight-page bulletin. Information on materials of construction and various types of meter designs are illustrated and described. Bul 150 — Brooks Rotameter Company.

Check 3992 opposite last page.

Alloy which has been recently developed for various concentrations of sulfuric, nitric and phosphoric acids at elevated temperatures is discussed in Bul 5-061 — Stainless Foundry and Engineering, Inc.

Check 3993 opposite last page.

Refractory metals and their process-equipment characteristics are discussed in eight-page bulletin. Included are tantalum, titanium and zirconium. Bul 978 — The Pfaudler Co., Div. of Pfaudler Permutit Inc.

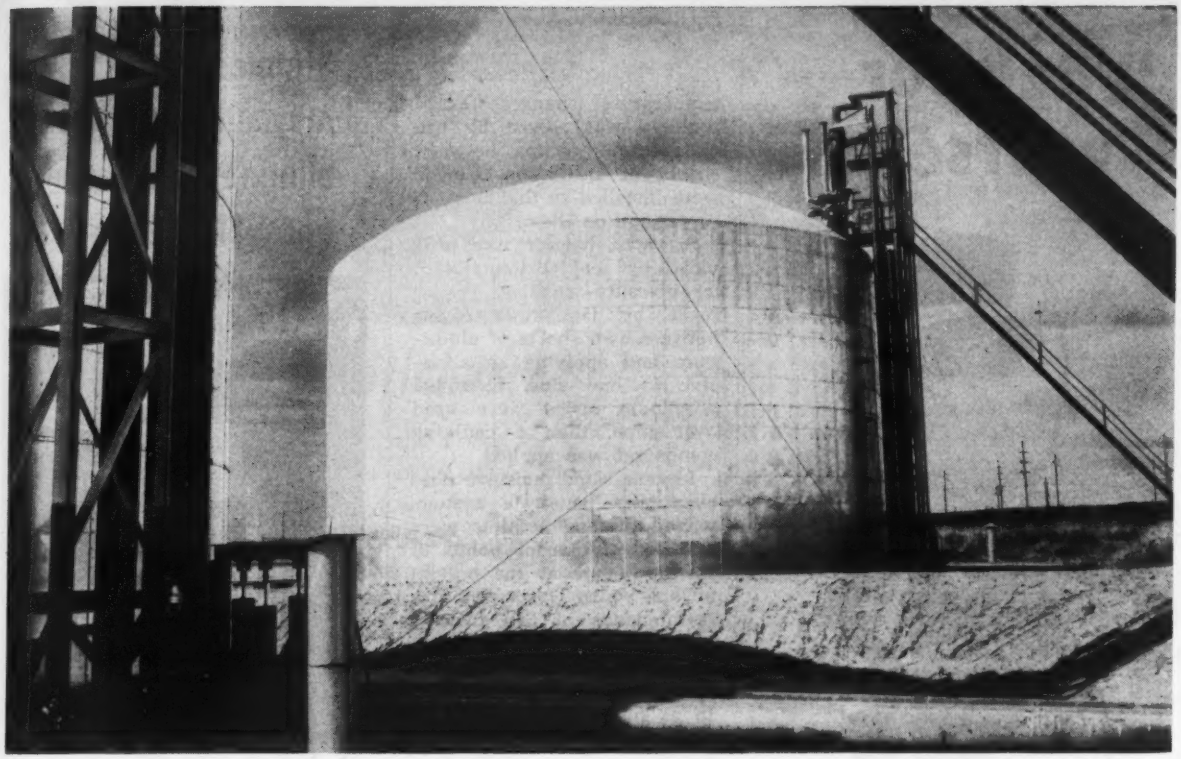
Check 3994 opposite last page.

Ductile iron pipe, its qualities, and applications, are discussed in 20-page booklet. Piping is suitable for a number of corrosive applications. "Ductile iron pipe" — James B. Clow & Sons, Inc.

Check 3995 opposite last page.

Impervious graphite equipment, such as heat exchangers, valves, crucibles, thermowells, pipe and fittings, are discussed in 32-page catalog. "Impervite" — Falls Industries, Incorporated.

Check 3996 opposite last page.



One of the two 45,000-bbl tanks designed for double-duty storage of butane and ammonia. Note vaporizer on side of tank for adding ammonia or butane vapor to top of tank as liquid is withdrawn from bottom. As far as is known, this is the first and only installation in the world where the same tanks are used for storing two such diverse products as liquid butane and anhydrous ammonia. As such, the entire installation is a landmark in the field of low-temperature storage of gases and liquids

Aluminum Reflective Insulation Helps Plant Save $200,000

GORDON WEYERMULLER, Petrochemical Editor
with **C. BRUCE BROWN,** Executive Vice President
St. Paul Ammonia Products, Inc.
South St. Paul, Minnesota

Storage of butane and ammonia in two 45,-000-bbl refrigerated, insulated tanks at pressure slightly above atmosphere results in saving of about 35% in capital cost

PROBLEM: A need for storage capacity for both butane and ammonia arose at St. Paul Ammonia Products. Stocks of butane are built up in the summer months when the material can be purchased most advantageously. The butane is used as a manufacturing feed stock to obtain hydrogen for ammonia in the winter when natural gas supply is interrupted.

As the butane is used in the winter, storage requirements develop for ammonia for use in the peak fertilizer season in the spring. Hence, storage tanks had to be suitable for both services.

Solution: Calculations indicated that storage at slightly above atmospheric pressure would be the most economical. Choice of an operating pressure of 5 psig was dictated by following considerations:

For ammonia, this pressure results in a storage temperature above −20°F. Use of this temperature of about −18°F eliminated the need for more expensive Charpy steel or other materials with satisfactory low-temperature impact strength. Accordingly, two 45,000-bbl storage tanks were constructed of regular carbon steel. Each tank is 80′ in diameter, 40′ straight shell height and 63′ high over the dome roof.

Use of 5 psig pressure, a little above atmospheric, also prevented the possibility of air leaking into tank when butane was being stored. Hence, danger of an explosive mixture being formed was eliminated. Storage temperature for liquid butane at 5 psig pressure is 25-45°F.

Aluminum Insulation

After consideration of many conventional methods of insulation, multi-wall aluminum (called Alumiseal) reflective insulation was selected for tanks for following reasons:

It was indicated that it would give a positive vapor seal. This is important in view of the wide variations in shell temperature and insulation temperature. For example, shell temperatures could vary from −18 to 45°F and ambient temperature from −40 to 110°F.

Another reason for selection of aluminum reflective insulation was that it would eliminate painting. Also, it was felt that the aluminum insulation would provide good protection in case of a fire around tanks.

Installation of Insulation

In installing the aluminum reflective insulation, shrinkage of tank shell circumference had to be considered. For a tank 80′ in diameter such as these, circumference can vary several inches as

temperature changes. This problem was solved by use of separator strips between sheets of insulation. Sheets were installed so that there is no tension on them.

A vapor barrier was provided by sealing joints with a pressure-sensitive tape made by laminating Mylar between two sheets of aluminum and applying an adhesive to one side. Extruded aluminum strips were used over tape, then a caulking compound was applied.

In case some moisture does eventually penetrate system, valved drainage outlets were installed at quarter points of the perimeter at the bottom of tank walls. This will insure maintenance of full thermal efficiency.

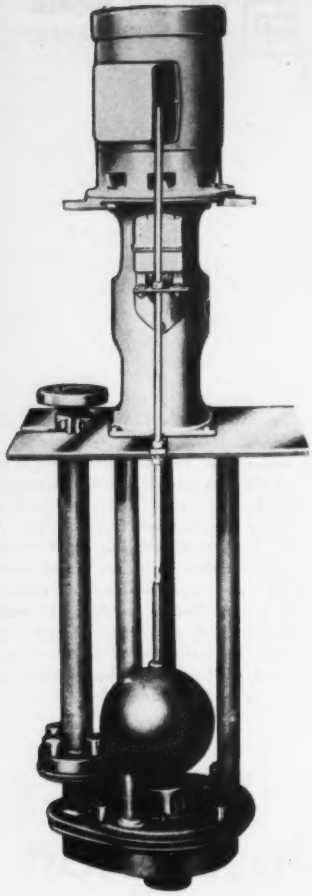
Insulation had to be installed to withstand winds up to as high as 100 miles per hour. It was fastened securely by welded studs and screws, layer to layer. Five layers of the aluminum insulation were used on the walls, with ¾" air spaces between them. The spherical top employs three sheets of reflective insulation, with 1⅝" air spaces between sheets.

Spherical top was installed with minimum waste of material by using tangent sections instead of conventional pie-shaped sections.

Refrigeration System

Refrigeration system consists of one ammonia compressor driven by an electric motor and a standby com-

Judge for yourself



Give Galigher's Acid-Proof Sump Pump A Trial Performance In Your Plant

Before you buy, try a Galigher Acid-Proof Sump Pump in your plant. Galigher Sump Pumps eliminate the common causes of pump failure. Constructed without troublesome submerged bearings, mechanical seals or packing, they transfer solutions, corrosives and abrasives over a wide feed volume range without speed adjustment; cannot be damaged even by 60% solid slurries; and its double thrustless design will not airlock. Galigher Sump Pumps are available in custom or production models of hard iron or stainless steel and with plastic, natural or synthetic rubber coverings . . . direct or V-drive.

Today, write for complete details on how you can try a Galigher Acid-Proof Sump Pump. Ask for Bulletin #SP-100.

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This same trial offer also applies to the world famous Vacseal Pump, precision engineered for rugged use.

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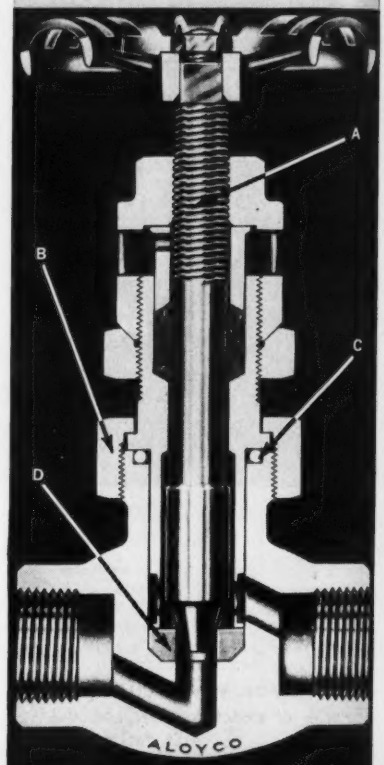
SP-512

Check 3997 opposite last page.

Stainless Steel* Aloyco Needle Valve eliminates leakage and galling!



A. OUTSIDE STEM THREADS are away from corrosive area, prevent galling.
B. UNION BONNET provides extra strength and easy disassembly.
C. TEFLON O-RING provides tough, leak-proof seal.
D. TEFLON SEATS are pressure-tight, dependable, won't gall. Renewable.

Alloys available: 18-8S, 18-8SMo, Aloyco 20, Monel, Nickel and others.

This #62 Stainless Steel needle valve has proved itself for 10 years in many types of severe corrosive service. It is particularly suitable for sensitive control of flow as in metering, or sampling for process plant, laboratory or pilot plant use. For more facts write: Alloy Steel Products Company, 1302 West Elizabeth Ave., Linden, New Jersey.

0.4

Longer Lasting ALOYCO VALVES
FOR USE IN CORROSIVE SERVICE

ALLOY STEEL PRODUCTS COMPANY

Check 3998 opposite last page.

pressor driven by a Diesel engine. While direct compression of the stored material is used for handling ammonia, a heat exchanger is employed for butane.

When either ammonia or butane is withdrawn from one of tanks, same material is vaporized in heat exchanger setup on side of tank as shown in photograph. This causes vapor to be sent to top of tank to keep pressure constant on tank interior as liquid is withdrawn. Hence, danger of collapsing tank due to formation of vacuum on interior is avoided. System for filling and emptying tanks is automatic.

Bottom of Tanks

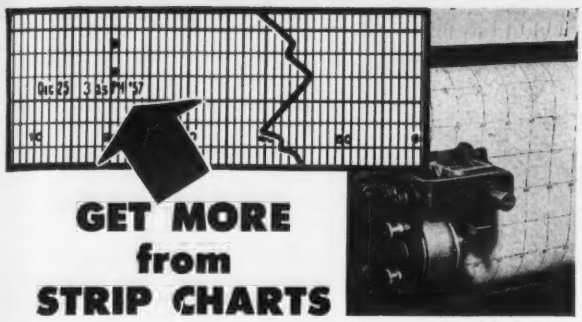
With the possibility of ammonia being stored at −18°F for long periods, question of freezing and heaving of soil under tanks had to be considered. Dished bottom section was insulated from concrete foundation by first applying Alumiseal Zero Perm vapor barrier — made by laminating a 1-mil sheet of aluminum between two ½-mil thicknesses of Mylar.

Joints were sealed with pressure-sensitive tape to provide water-vapor permeance of 0.0000 to 0.0134 grams/100 sq in/24 hr. Foamglas was then applied over the vapor barrier. Foamglas was covered with a sheet of roofing felt to minimize abrasion.

Pipes through which warm air can be blown were buried in fill beneath concrete. Thermocouples were installed at several points in fill to permit measurement of ground temperature.

Results: Savings of about 35% in capital cost have been achieved through storage at pressure slightly above atmospheric as compared to storage at higher pressure and temperature. Since total cost for two tanks was $580,000, this means about $200,000 was saved. Total cost includes refrigeration system and all piping.

Of the $580,000 total cost, $120,000 was for the aluminum reflective insulation. This Alumiseal insulation will re-



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ROYSON ENGINEERING

HATBORO, PA. OSborne 5-2800

Check 3999 opposite last page.

TANK-O-METER

FOR MEASURING TANK CONTENTS ANY DISTANCE AWAY

TANKS MAY BE...

• BURIED OR ELEVATED
• OPEN • CLOSED • VENTED
• UNDER PRESSURE • UNDER VACUUM
• UNDER PRESSURE AND VACUUM

ACCURATE • RELIABLE • DURABLE

Also gauges for:

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Pressure and Vacuum
Differential Pressure
Inclined Manometers
for draft, pressure or differential pressure.

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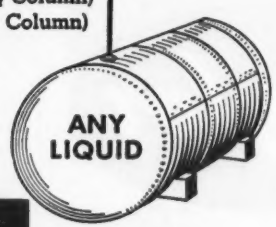

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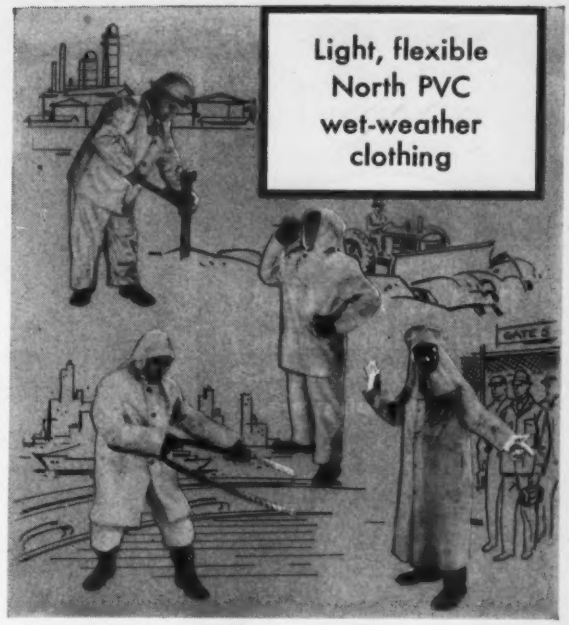
PATERSON, N. J.

SINCE 1898

Check 4000 opposite last page.



Here's head-to-toe protection against wind, rain and sleet!

Welded Seams

Seams are stitched with synthetic thread, then shielded and electronically welded for maximum strength and protection. In addition, buttons are electronically welded in place.

Come hail or high water, your men will stay dry and comfortable in North PVC foul-weather gear by Jomac.

They'll stay dry because North PVC clothing is coated on both sides . . . all points of strain are reinforced . . . and all seams are completely sealed by electronic welding.

And they'll stay comfortable because North PVC clothing is light and flexible . . . and the coats have set-in sleeve design and generous cut that allow full freedom of motion.

North PVC clothing is bright "safety" yellow for maximum visibility and safety. Will not crack, flake or peel, in use or in storage . . . extremely resistant to abrasion and snagging . . . wonderfully easy to clean. Write today for folder showing North PVC clothing line!

Also ask about our complete line of North PVC coated gloves

JOMAC

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Philadelphia 38, Pennsylvania

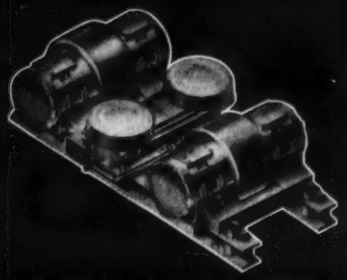
"Jomac Sells Quality . . . and Quality Sells Jomac!"

Check 4001 opposite last page.

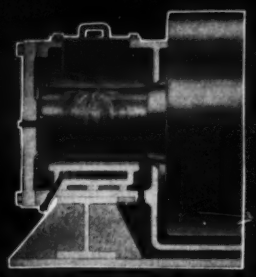
Traylor

ROTARY KILNS

Feature single support type roller bearings for perfect alignment:

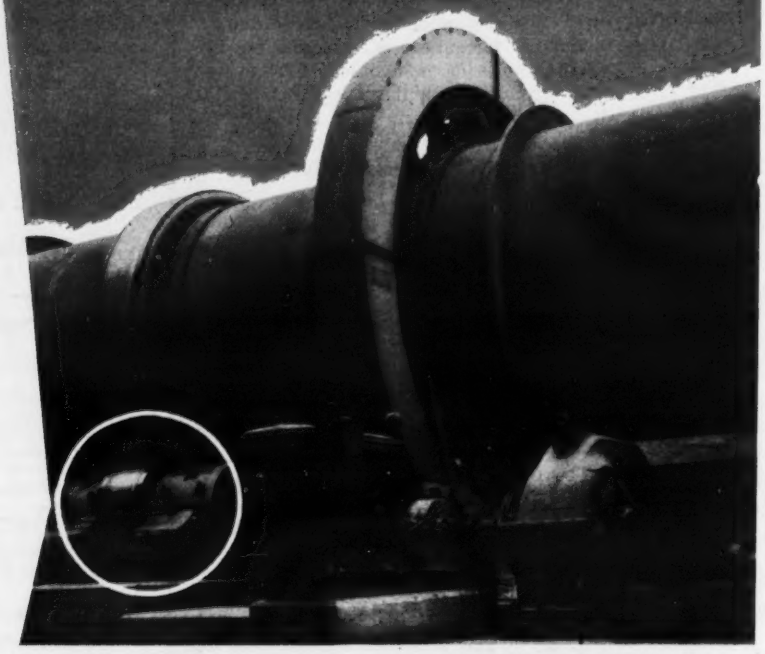


Standard roller support made with cast steel or forged steel rollers mounted on forged steel shafts.



Oil reservoir and oiling mechanism distributing oil over the shaft in a Traylor single support roller bearing.

Traylor-made ROTARY KILNS demonstrate engineering leadership!



Hundreds of Traylor Kilns in use today reflect the sound design and high standards of Traylor engineering leadership. Put your machinery problems in the hands of experienced Traylor engineers for a sure way to a quick and efficient solution. Write for Bulletin No. 1115.

Traylor

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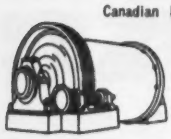
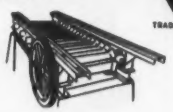


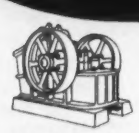
BALL MILLS

ROTARY KILNS



APRON FEEDERS

PRIMARY GYRATORY CRUSHERS



JAW CRUSHERS

SECONDARY GYRATORY CRUSHERS

Check 4002 opposite last page.

flect 95 to 97% of all heat striking it on either side. It will not rust and requires a minimum of maintenance. Also, it enhances appearance of plant.

(Entire storage tank installation was designed, fabricated and field-erected by Graver Tank & Mfg. Co., Div. — Union Tank Car Company, 4809 Tod Ave., East Chicago, Ind.)

Check 4003 opposite last page.

(Aluminum used in reflective insulation is product of Aluminum Company of America, Pittsburgh 19, Pa.)

Check 4004 opposite last page.

(Alumiseal reflective insulation, covered by U.S. patents, is product of Alumiseal Corporation, 429 East 53rd St., New York 22, N. Y.)

Check 4005 opposite last page.

(Insulation was installed by Asbestos Products, Inc., St. Paul, Minn.)

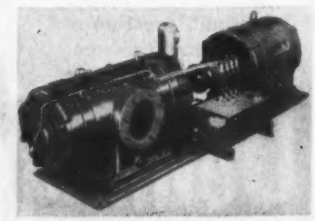
(General Contractor for ammonia plant was The Lummus Co., 385 Madison Ave., New York 17, N. Y.)

Compactness feature of rotary booster compressors

Uses: For use in packing plants, cold storage warehouses or other applications where low temperatures are required for process work.

Features: Unit features high efficiency, compactness, versatility of application and ease of maintenance.

Description: Of the sliding-vane type, rotary booster compressor is internally lubricated by means of a me-



Compressor ranges in capacity from 4 through 400 tons of refrigeration

chanically driven force-feed lubricator. It will fit readily into multi-stage systems as the first or booster stage.

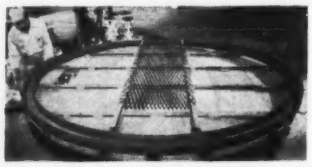
(VRB compressor is product of Vilter Manufacturing Company, Milwaukee 7, Wisc.)

Check 4006 opposite last page.

Petrochemical furnace improved by use of silica baffle

Resists vanadium pentoxide at 1300°F

A recent improvement made in the petrochemical furnace, known as the Iso-Flow furnace, consists of the use of Foamsil, a fused silica refractory, for the baffle used in the top to retain heat. Fused silica baffle lasts longer than former units made of insulated alloy steel. Also, it is lower in initial cost and easier to install.



Baffle for furnace being assembled

Sulfur and vanadium in fuel oil burned in furnace produce highly destructive vanadium pentoxide. This corrosive product is withstood at temperatures up to 1300°F by the fused silica baffle.

Since the silica refractory weighs only 12 lb/cu ft, it does not require as much support as other materials considered. Fused silica blocks, 17 x 22" were slid along alloy steel channels to form a solid cover.

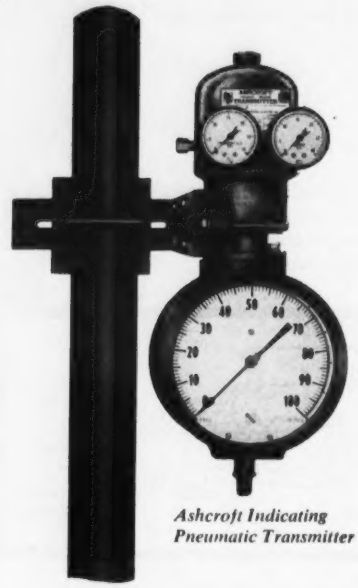
(Foamsil refractory is product of Pittsburgh Corning Corporation, One Gateway Center, Pittsburgh 22, Pa.)

Check 4007 opposite last page. (Iso-Flow furnace is product of Petro-Chem Development Co., Subs of Yuba Consolidated Industries, Inc., 122 East 42nd St., New York 17, N.Y.)

Check 4008 opposite last page.

signal action

ASHCROFT PNEUMATIC TRANSMITTERS give you a true primary and transmitted signal for indication or control



Ashcroft Indicating Pneumatic Transmitter

Now—detect with precision accuracy the slightest change in primary pressure or temperature. Transmit this signal quickly to your indicators or controllers. Ashcroft Pneumatic Transmitters achieve these results for you at the lowest initial and operating costs.

Full-range, solid-front indicating and totally accessible nonindicating transmitters eliminate the need for costly high pressure lines, yet permit complete monitoring of process conditions in remote areas.

Narrow-span Ashcroft Transmitters are expressly designed with highest sensitivity and repeatability for the most accurate primary signal feed to controllers. You get better control and purer, lower-cost final products.

Only in Ashcroft Pneumatic Transmitters can you get the wide choice of Ashcroft Duragauge Bourdon tubes or American mercury or gas-actuated systems for sensing pressure or temperature conditions. You also get a time-proven, obstruction-proof, force-balance, nonbleed relay for economical, maintenance-free 3-15 psi or 3-27 psi signal transmission.

Write for factful Bulletins 360 and 361 or ask your nearby Ashcroft Distributor to help you select the right transmitters and receiver gauges for your specific requirements.

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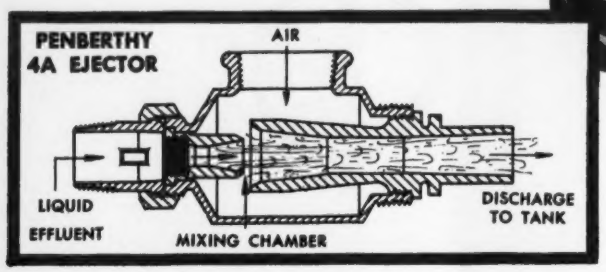
Check 4009 opposite last page.

Money-Saving Way To Handle INDUSTRIAL WASTES

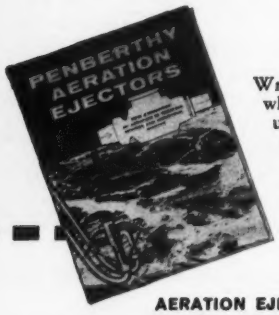
Where pollution and waste-disposal are problems, the activated sludge process has been recognized generally as the most effective way to make effluents suitable for discharge into streams, sewers, etc.

Successful operation of this system depends upon efficient and economical aeration — the dispersion of millions of tiny bubbles of dissolved oxygen throughout the solution. Compared to the 4 to 5% absorption by porous plates on mechanical systems, Penberthy Aeration Ejectors provide 20 to 25% oxygen absorption while using 40% LESS horsepower.



This remarkable efficiency of Penberthy aeration over older methods is being demonstrated in actual installations every day. It is simple to design, install and operate ... and costs much less for all three.

Penberthy aeration systems can be designed by any competent engineering staff to suit any aeration requirement. Equally important, they offer a practical means to expand present capacity without expanding existing tank volume.



Write for a copy of our new brochure which contains practical information useful in planning, installing and cost-estimating new or expanded facilities. You will also find our engineering staff helpful with your specific problems.

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PENBERTHY MANUFACTURING COMPANY
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Prophetstown, Illinois

There's certain satisfaction in **PRODUCTS BY** PENBERTHY

- EJECTORS
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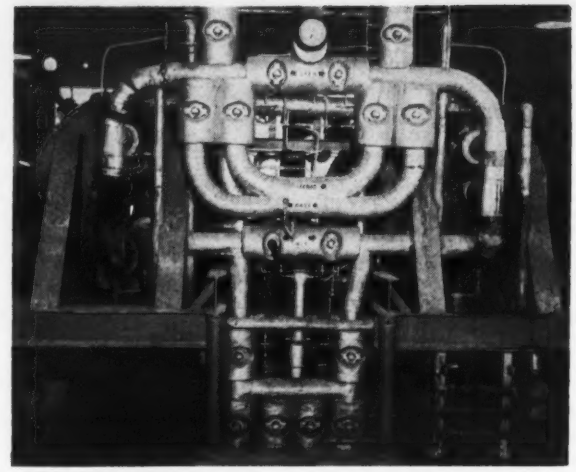
- GAGE VALVES

Check 4010 opposite last page.



Sixteen of valves in service on urea filtration setup at Grand River Chemical. Note heat-transfer cement around lines and valves over steam tracing

Valves with Teflon sleeves require minimum maintenance

Urea plant finds heat transfer cement applied over steam tracing useful for keeping solutions at temperatures of 200-300°F

GORDON WEYERMULLER
Petrochemical Editor
with **E. H. BRUNSTING**
Project Engineer
Grand River Chemical Division
Deere & Company, Pryor, Oklahoma

Very little if any maintenance has been required on plug valves with Teflon sleeves in service at Grand River Chemical for more than three years. A considerable number of the valves are used for handling 80 to 100% urea at temperatures of 200-300°F and pressures from full vacuum to 125 psi.

Valve combines the corrosion resistance of the proper alloy for a specific service with the non-sticking, inert characteristics of Teflon. Elimination of metal-to-metal contact prevents galling and sticking.

Alloy tapered body and plug are separated by Teflon sleeve, which provides positive sealing and makes lubrication unnecessary. Teflon diaphragm acts as a friction ring between bottom of plug and the adjusting plunger and seals bottom of valve. Sizes are available from ¼ through four inches.

Heat-transfer Cement

A heat-transfer cement, called Thermon, was applied over steam tracing on lines and valves to effectively keep urea solution at desired tem-

perature of over 200°F.

Thermon is a non-metallic adhesive compound with good heat-transfer properties. It makes the steam tracing much more effective and is economical to use.

(Type F valves are product of The Duriron Company, Inc., Dayton 1, Ohio.)

Check 4011 opposite last page.

(Heat-transfer cement is product of Thermon Mfg. Co., 1017 Rosine St., Houston, Texas.)

Check 4012 opposite last page.

Accuracy of transducer is ± 0.25% of span

Uses: For converting a measurement of pressure, liquid level, temperature or mechanical motion into a shaft position for operating transmitting slidewires, alarm switches, analog to digital encoders and deviation contacts.

Features: Standard accuracy of unit is ± 0.25% of span.

Description: Transducer employs electronic balancing system with an amplifier to operate a balancing motor. Plenty of torque is provided for precisely positioning encoder or slidewire contact.

Sensing element may be a capsular element, or it may be a helical element or a differential pressure unit. Motion transmitted from sensing element through a linkage positions core of a differential transformer. Coil is repositioned through a mechanical feedback system to return the electrical system to balance.

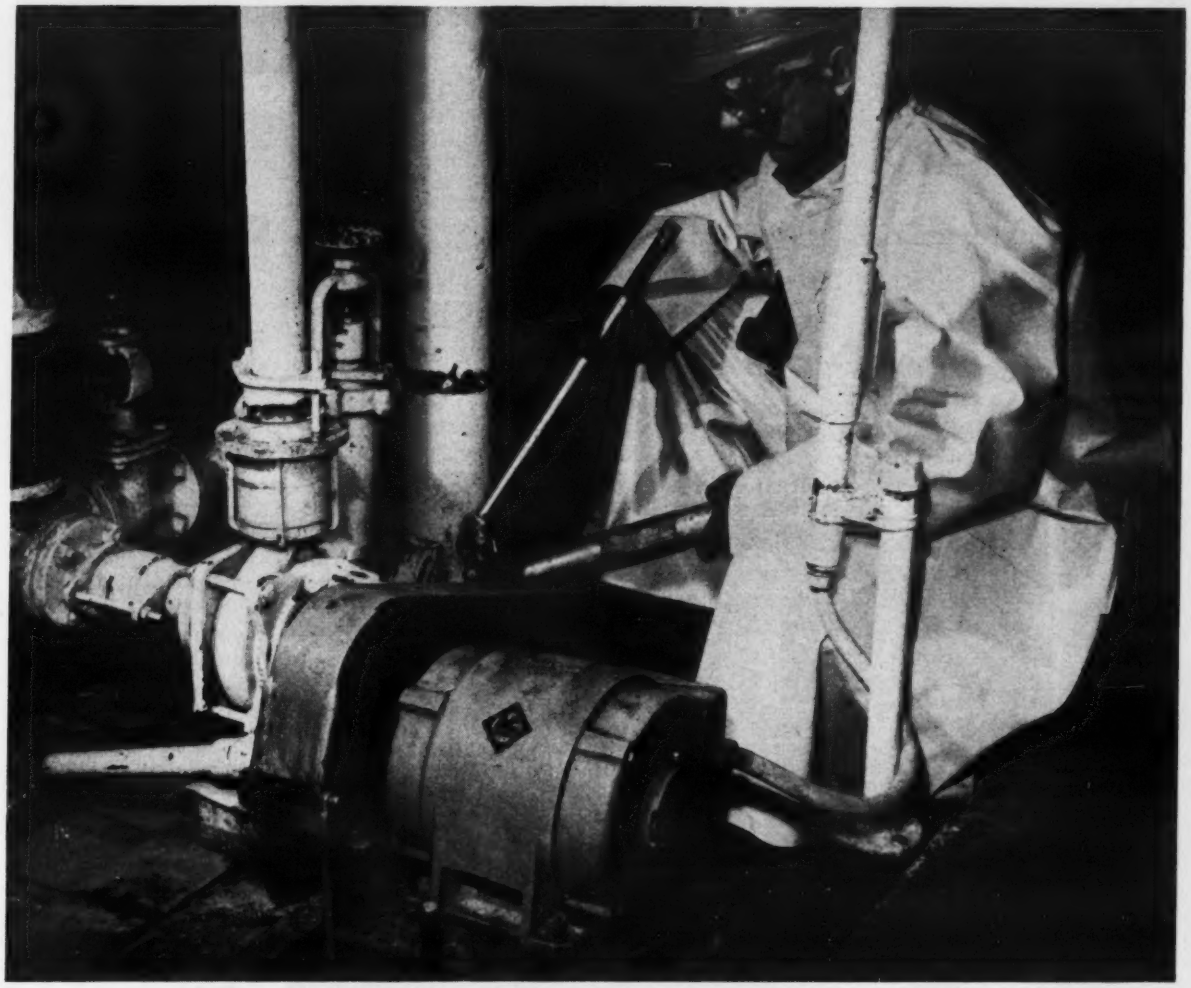
A pointer positioned by the shaft indicates the measured variable on a 3¾" dial. Remote readout can be obtained through the retransmitting slidewire. Readout is any function of the measured variable, as determined by the type of cam used in the rebalancing system.

(Dyna-Servo transducer is product of The Bristol Company, Waterbury 20, Conn.)

Check 4013 opposite last page.

ALLIS-CHALMERS

A-1235



ACID AREA APPLICATION. Safety equipment and clothing are a "must" for personnel in the acid atmosphere of Dow's chlorine plant at Freeport, Texas. This **Super-Seal** motor came prepared, too — with **Poxeal** insulation guarding the stator.

Nothing...but nothing...stops Super-Seal motors

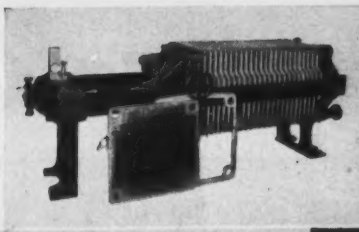
In a tough acid pump installation, Dow Chemical's Texas Division experienced no end of motor troubles. It seemed nothing could stand up in that humid, corrosive atmosphere. Reports Dow: "Even with totally enclosed motors, winding failures were frequent." And, they might have added, expensive.

Then came *Super-Seal* motors— with amazing *Poxeal* insulation. A durable case of epoxy-resin encloses the winding end turns and slot portions of the stator . . . the most complete protection ever developed. Result? The *Super-Seal* motor, *after two years* of continuous operation in the acid area, is as good as ever. So good, in fact, that Dow has ordered 150 *Super-Seal* motors for a new chemical plant at Freeport, Texas.

Isn't it time to revaluate *your* motor standards? There's a good chance that *Super-Seal* motors can solve your motor problems, too. Contact your A-C representative or distributor, or write **Allis-Chalmers,** General Products Division, Milwaukee 1, Wisconsin.

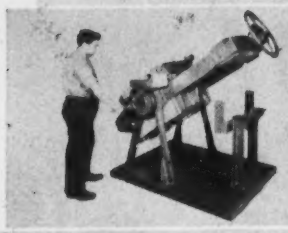
Super-Seal and Poxeal are Allis-Chalmers trademarks.

Check 4014 opposite last page.



S FILTER PRESS

Most widely used, most versatile and flexible in application; produces uniform, dense cakes which can be effectively washed or extracted; uses any filter medium or filter aids; handles high viscosity materials at high pressure.

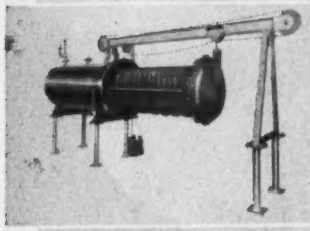


h "TILTYPE" FILTER PRESS

Uniform cakes lie horizontally while filtering; frames are dumped when in vertical position, allowing easy handling; filtration can be started and stopped at will.

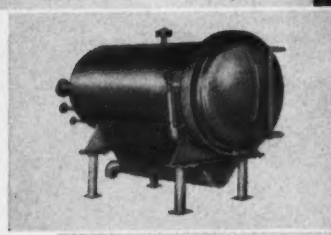
r CONTINUOUS THICKENER

For thickening, washing, extracting or leaching at increased rate, independent of settling rate of solids; requires less floor space and head room than settling type thickeners.



i HORIZONTAL TANK—VERTICAL LEAF FILTER

For efficient, large-volume clarification of slurries with maximum of 5 to 6% solids; quick discharge of cake and easy cleaning; no leakage, contamination or loss of liquid.

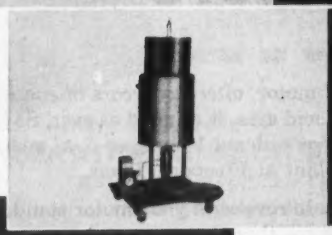


v ROTARY LEAF SLUICING FILTER

Has rotating leaves so that spray from sluicing nozzles impinges directly on every square inch of filter area to completely remove cake as a slurry through screw conveyor, without opening filter.

e VERTICAL TANK—VERTICAL LEAF FILTER

For clarifying slurries containing low percentage of compressible solids of no value; uniform, high filtration rate; used with precoats; solids quickly cleaned or sluiced out.



r ENCLOSED TANK HORIZONTAL PLATE FILTER

Forms cakes of uniform density and of desired thickness; no unfiltered material and no pressure in tank; fast flow rate; uses any filter medium; also can wash, extract and dry cake.

Established in 1860
100 Years of Service

We Sell FILTRATION *not* the Filter

The Shriver pressure filters you see here are representative of many types we design and produce. Nevertheless, the filter we may suggest for your needs —after careful tests and study— may not necessarily be in the Shriver line. As a matter of fact, manufacturers of other types of filters are often beneficiaries of our analyses. For ours is a scientific, practical approach to your filtration problem, based on a wealth of ideas, talent and experience. Recommendations are always made in your best interest. That is why at Shriver's "We sell filtration" and the filter the process calls for then sells itself. May we be of assistance?

T. SHRIVER & COMPANY, Inc.
846 HAMILTON STREET, HARRISON, N. J.

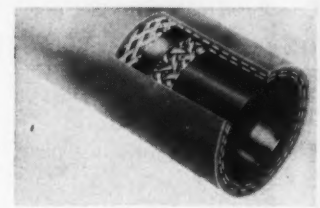
Check 4015 opposite last page.

PETROCHEMICALS

Ammonia hose safe at 300 psi

Two types of ammonia transport hose are available, both designed to withstand working pressures to 300 psi and meet safety regulations.

Paranite BW ammonia hose has braided wire construction. Cord braids are also used. Neoprene cover resists



Paranite BW ammonia handling hose

weather and scuffing. Hose is flexible and easy to handle. It is available in sizes from ⅜ to 2″ and 50′ length.

Homoflex ammonia hose is a braided-ply cord construction. It also has a neoprene cover. It is available in sizes ¼ to 2″ and 50′ lengths.

(Paranite BW and Homoflex ammonia hose are products of Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J.)

Check 4016 opposite last page.

Chromatographic peaks precisely interpreted by integrator

Disc integrator makes possible precise area measurements on a routine basis. Unit, adaptable to most strip-chart recorders, automatically measures the area while the record is being made.

In effect, the ball-and-disc integrator divides the area under the curve into minute squares or "counts". Number of counts is indicated by number of chart divisions crossed by integrator pen. Integrator has an accuracy of 0.1% full scale.

(Integrator is development of Disc Instrument Company, 12671 Bubbling Well Rd., Santa Ana, Calif.)

Check 4017 opposite last page.

THAT'S INTERESTING

Lab gifts for gifted

Gifted high school pupils are being aided by a home program sponsored by California State Polytechnic College and Leach Corp. of Los Angeles. Leach supplies selected youngsters with home lab equipment. College supervises and directs their studies.

Many happy returns

Chemical industry stocks pay higher returns on stockholder equity than average for all industry — 13% compared to 10.8. Of all dividends, one dollar in every seven is paid by chemical industry.

Junior CPI firm formed

Blaw-Knox Company is sponsoring a new Pittsburgh firm called Blaw-Co. Composed of 20 teen-agers, new company is manufacturing aluminum cookie sheets, felt Christmas stockings.

For more information on product at right, specify 4018 see information request blank opposite last page.

SCOPE in INDUSTRY SPECIALIZATION from...

ALLIS-CHALMERS

an "Outside Story" about Allis-Chalmers products

Self-protection against weather is built into a variety of Allis-Chalmers products — electrical or mechanical. This "Outside Story" through a broad range of A-C equipment (and only A-C offers such a scope of outdoor products) *eliminates the need for costly protective enclosures in many operations.*

Pumps, motors, compressors, mechanical drive equipment, control and switchgear with inspection alleys — all are designed to perform 'round the calendar while exposed to the elements.

For single-source availability of a tremendous scope of up-to-date equipment, designed for outstanding quality control, contact your A-C representative. Or write Allis-Chalmers, Milwaukee 1, Wisconsin.

Products for the Chemical Industry: Electrical Generation and Distribution Equipment; Pumps (rotary vacuum and centrifugal); Compressors; Motors and Control; Mechanical Power Transmission Equipment; Processing Machinery (mills, kilns, screens, etc.); Water Conditioning Systems, plus Materials Handling Equipment.

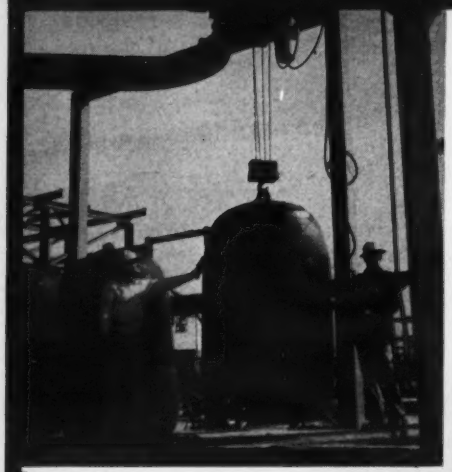
A-C ALLIS CHALMERS

A-5917-C

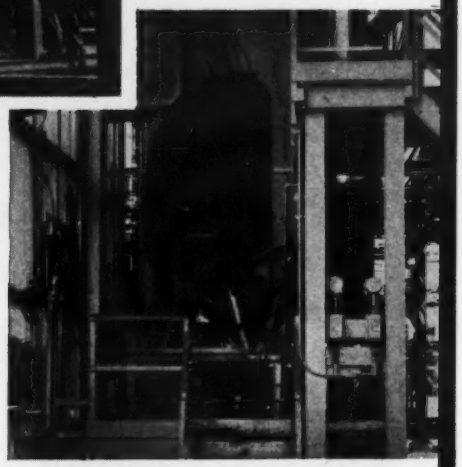
PROBLEM:

HANDLE ALUMINUM CHLORIDE SAFER, FASTER, AT LOWER COST

or other "problem" materials



Handling aluminum chloride, in U.S. Sealdbins, is a safe, fast one-man job with lift truck or crane. Storing is simple, inexpensive. Sealdbins are their own weather-proof warehouses.



U.S. Sealdbin Containers empty quickly, directly into a process conveyor. No loss of aluminum chloride. No risk of personnel injury.

SOLUTION:

USE PROVEN U.S. SEALDBIN CONTAINERS

Pictured above are U.S. Sealdbins handling aluminum chloride at the Baton Rouge Refinery of Esso Standard, Division of Humble Oil and Refining Company. Made of high-strength cord fabric and rugged synthetic-rubber compounds, Sealdbins are noncorrosive and moistureproof. They can be collapsed and returned in a fraction of their outbound space. Find out how much time, labor and money U.S. Sealdbin Containers can save for *you*. For latest U.S. Sealdbin facts, write, wire or phone

US RUBBER

TRANSPORTATION PRODUCTS DEPT.

United States Rubber

10 Eagle St., Providence, R. I., DExter 1-4000

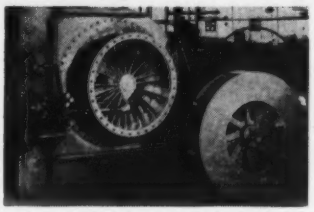
Check 4019 opposite last page.

Solvent-recovery fan is spark-resistant and gas-tight

Uses: For solvent recovery applications in the petrochemical field.

Features: Entire fan is designed and built to minimize the possibility of an explosion when handling highly volatile solvent vapors.

Description: Fan has a radial blade wheel 50″ in diameter, fabricated of aluminum. Spider is cast manganese-bronze. Variable inlet vane control is provided for automatic volume regulation; this accessory is of gas-tight construction.



Fan housing (center) is provided with variable inlet vanes for volume control. Radial blade wheel is at right

Unit delivers 19,000 cfm at 1780 rpm at 100°F and 42.5″ wg static pressure.

(Solvent recovery fan is product of Industrial Division, American-Standard, Detroit 32, Michigan.)

Check 4020 opposite last page.

Full-flowing ball valve is turbulent free

Recently announced line of ball valves provide a full port through the sphere, eliminating restriction of turbulence. Dual-compressive filleted design of seats makes operation of unit easy.

Shaft has triple seals and positive bearing. Seal well and torque are minimized. Handle can be placed in any one of eight positions. Arrow shows position of valve.

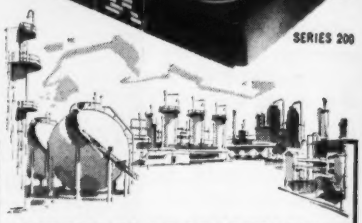
(Ball valve is product of The J. L. Putnam Company, Inc., P O B 996, Portland, Maine.)

Check 4021 opposite last page.

ACCURATE CHEMICAL FEEDING

FROM .65 gph TO 1624 gph

SERIES 200



AMERICAN PROPORTIONING PUMPS have repetitive metering accuracy of ± 1% when operating between 10% and 100% of capacity. Feed precisely metered fluids or slurries in all ratios, with controlled process variables.

- interchangeable liquid ends
- spherical self-aligning bearings on crank and crosshead
- crossheads of hardened and ground steel ride on cast iron
- nylon dust covers protect bearings
- NEMA frame motors
- heavy duty reducers

Send for free bulletin.

SERIES 100
Simplex models pump up to 13.10 gph at maximum pressure of 1000 psi. Duplex models double that capacity.

SERIES 200
Simplex models pump up to 812 gph at maximum pressure of 1000 psi. Duplex models double that capacity.

SERIES 100

AMERICAN METER COMPANY
INCORPORATED ESTABLISHED 1836
pump division
13500 PHILMONT AVE., PHILADELPHIA 16, PENN.

Check 4022 opposite last page.

NEW LITERATURE

Petrochemicals

Seamless mechanical tubing and how tubes can be matched to jobs are discussed in six-page folder. Two general purpose alloy steels which lend themselves well to standardization are discussed. Both of these are available in tube form in the complete range of sizes. Folder TDC-193 — Tubular Products Division, The Babcock & Wilcox Company.

Check 4023 opposite last page.

Electric operators for ball valves from ¼ to 4" size range, are described in data sheet. Operators are resistant to weather and vapor and can be manually operated in case of power failure. They have a life expectancy in excess of 500,000 cycles. "Electric Operators For Ball Valves" — Jamesbury Corp.

Check 4024 opposite last page.

Compressors of turbo-charged, gas-engine-driven type are discussed and illustrated in six-page bulletin. Units range in horsepower from 660 to 1320 bhp. Bul 179 — Clark Brothers Co., One of The Dresser Industries.

Check 4025 opposite last page.

Thermal insulations for all types of industrial requirements and applications ranging from −400 to 3000°F are described in 54-page A.I.A. File No. 37-D — Johns-Manville.

Check 4026 opposite last page.

Indicating pyrometer controller that maintains accuracy and sensitivity under severe plant operating conditions is discussed in Bul 00-35 — Atlantic Pyrometers, Inc.

Check 4027 opposite last page.

Control devices, including motors, switches and other equipment, are discussed in 72-page publication. Bul GEC-1260D — General Electric Company.

Check 4028 opposite last page.

Pneumatically-actuated timer, adjustable from 0.3 to 60 cycles per minute, is described in detail in two-page bulletin P-20 — Automatic Control Equipment, Inc.

Check 4029 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

SILICONE NEWS from Dow Corning

Down Foam and Up Production

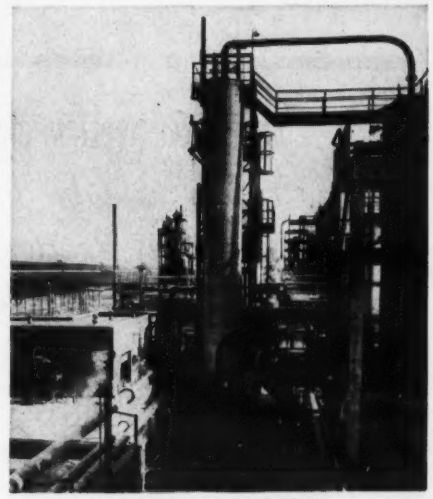
IN PACKAGE DYEING

No matter what you produce or process, you'll find Dow Corning silicone defoamers are economical; savings and production advantages are multiple. Prove this with your own tests using a generous trial sample that's yours for the asking. In writing for this free sample, please indicate your problem and mention the type of system—oil, aqueous, nonaqueous, food products, or any other. Address Dept. 3203 for a rapid reply.

Job-Proved Dow Corning Silicone Defoamers Save Time, Material, Money

Foam may be fine in a brewery. But in most processing plants, it's a sign of inefficiency. Foam reduces production capacity, slows processing, increases waste — can skyrocket your costs way out of proportion. But why accept foam as a necessary evil when Dow Corning silicone defoamers are so readily available to knock out "bubble trouble" . . . quickly, easily and economically?

Imagine . . . just a few drops of a Dow Corning silicone defoamer is all it takes to control even the most violent and persistent foamers. And these versatile silicone defoamers neither alter nor contaminate products or processes. This permits you to use a Dow Corning defoamer wherever foam is a problem — in textile dyeing, papermaking and sizing; in refining, distilling and gas "scrubbing"; in food processing and packaging; in formulating paints, adhesives, pharmaceuticals . . . you name it.



IN REFINERY GAS SCRUBBING

Your nearest Dow Corning office is the number one source for information and technical service on silicones.

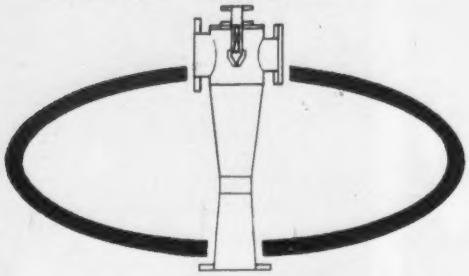
first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.

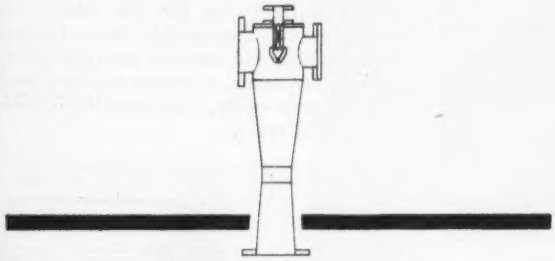
Check 4030 opposite last page.

CROLL-REYNOLDS
Jet-Venturi



Fume Scrubbers

minimize odors
clean and purify air
and other gases
without fan or blower



ADDITIONAL APPLICATIONS

to recover valuable solids
use as Jet Reactors

SEND TODAY FOR COMPLETE CATALOG

Croll-Reynolds CO., INC.

Main Office: 751 Central Avenue, Westfield, N. J.
New York Office: 17 John Street, N. Y. 38, N. Y.
CHILL-VACTORS • STEAM JET EVACTORS • AQUA-VACTORS
FUME SCRUBBERS • SPECIAL JET APPARATUS

Check 4031 opposite last page.

cp IDEAS: from other industries and nuclear field — new trends in research, process, services

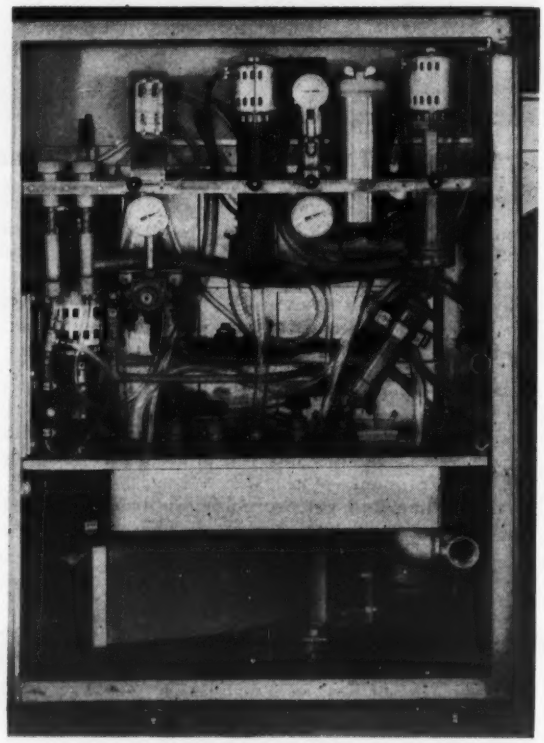
Incorporating an efficient chemical processing and distribution system, machine automatically . . .

Develops, dries X-ray film in six minutes

Equipment occupies only 15 sq ft floor space, automatically processes either roll or individual sheet film

INDUSTRIAL users of X-ray equipment can now have dry, ready-to-read radiographs within six minutes, thanks to the development of a new machine. Fully automatic in every way, the device is designed around an efficient chemical processing and distribution system. The machine is capable of handling either continuous rolls or individual sheet film. Size of latter can be up to 14x36".

Only 15 sq ft of floor space are occupied by the compact equipment. Unit is said to cost approximately 40 percent less than bulkier and slower models used for this purpose in the past.



View of chemical chamber of film processor showing pumps, heat exchanger, filter, and pipe arrangement

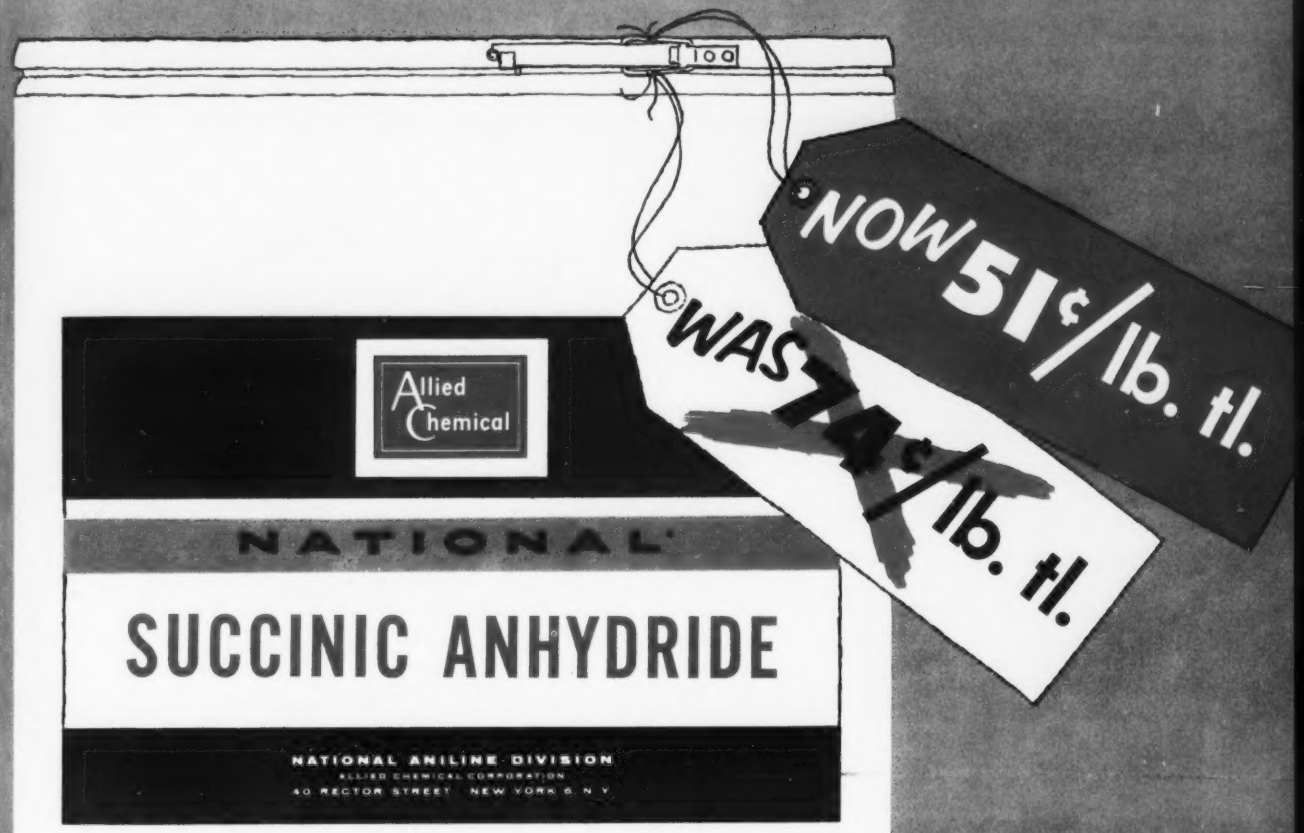
Vertical Film Path

Much of the machine's compactness is due to the use of a vertical, rather than horizontal, film path in the drying section. Also, elimination of stop bath in chemical section contributes to the reduction in size. Design permits optimum processing time in minimum length film path. The selected speed also allows lower processing temperatures, which is reported to add to the reliability of the operation.

Fan and motor that supply heated air to dryer section are mounted underneath chemical section. This too, contributes to machine's compactness.

An endless cotton cloth belt drive arrangement conveys film through unit. Operation is simple and bypasses need for expensive worm-gear drives. Staggered drive rollers guide film through machine. Provisions

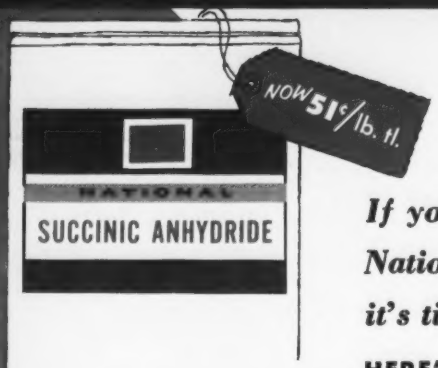
Important Price Reduction!



New low "incentive price" offered to stimulate volume use in coatings, resins, plasticizers, elastomers, adhesives, etc.

Future substantial price reductions probable if consumption grows as contemplated.

READ FULL DETAILS OF HOW YOU CAN BENEFIT



If you have considered National SUCCINIC ANHYDRIDE too costly for your use, it's time now to take another look!

HERE'S WHY...

We are so sure that National SUCCINIC ANHYDRIDE should and can be a major intermediate that we are underwriting future volume with a very attractive "incentive price" *now*.

Even more important, your volume use can help bring additional price reductions that will make the ultimate cost of using this reactive organic comparable to that of other widely used resin chemicals.

So you have every reason to re-examine National SUCCINIC ANHYDRIDE *now*. We'll make it easy for you to do so!

WHY NATIONAL SUCCINIC ANHYDRIDE?

National SUCCINIC ANHYDRIDE has an unusually interesting molecular structure — what researchers colloquially call a "small molecule" — that imparts many desired properties to coatings, resins and plasticizers. At our new low "incentive price" (and with anticipated future reductions based on substantial increased consumption), it can be the basis for many improved end-products.

And, at its new low price, National SUCCINIC ANHYDRIDE should now find increasingly important use in pigments, pharmaceutical intermediates, cosmetic ingredients, perfume bases, corrosion preventives, photographic chemicals, lube oil additives, insect repellents and the like.

Its reactions commend re-study by those who work with esters, acyl compounds, lactones, pyrroles as well as intermediates leading to five-membered cyclic structures.

WHAT IS NATIONAL'S POSITION?

National is America's only producer of SUCCINIC ANHYDRIDE for sale. We have long experience, integrated production and efficient manufacturing processes.

For new users, we can promptly supply laboratory and pilot-plant quantities from our present production. Additional capacity should be on stream in the near future.

We are prepared to install ever-increasing capacity with cumulatively decreasing costs to make National SUCCINIC ANHYDRIDE a major resin chemical as well as an important economic organic intermediate.

WHAT YOU SHOULD DO NOW

Be sure your Research, Product Development and Marketing people see this announcement. Discuss it with them.

Find out what National SUCCINIC ANHYDRIDE at 51¢/lb. can do to increase your sales and open new product opportunities.

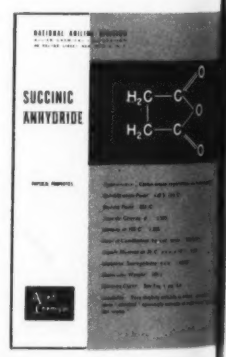
Check what possible future substantial price reductions (based on increased consumption) can do to further increase your sales and profits.

Then — let us know your anticipated needs so we can work with you.

Research & Product Development Men:

HERE'S THE TECHNICAL DATA YOU NEED

Our 40-page Technical Bulletin I-11 SUCCINIC ANHYDRIDE contains complete physical properties, all important reactions, infrared absorption spectrogram, suggested uses and a bibliography of 302 references – all the fundamental data needed for your investigations. Ample working samples will be sent without charge. Use the convenient coupon below for prompt action.



Please send_____copies of your Technical Bulletin I-11-SUCCINIC ANHYDRIDE

☐ Please send working sample

☐ Have representative call by appointment

Name_____ **Title**_____

Company_____

Address_____

Allied Chemical

NATIONAL ANILINE DIVISION

40 Rector Street, New York 6, N. Y.

Atlanta Boston Charlotte Chicago Greensboro Los Angeles Philadelphia Portland, Ore. Providence San Francisco

In Canada: ALLIED CHEMICAL CANADA, LTD., 100 North Queen St., Toronto 18

Distributors throughout the world. For information: ALLIED CHEMICAL INTERNATIONAL • 40 Rector St., New York 6, N. Y.

are also made for shrinkage or swelling of film between wet and dry sections.

Pump System

A Jabsco 175 rpm pump is an integral part of the machine. It replenishes processing solutions according to amount of film being fed into machine. Liquids are stored in two 25-gal drums located outside of machine.

Specially designed centrifugal recirculating pumps are used on developer and fixer tanks. Developer is recircu-

Looking down into processor with cover removed. Chemical section is in back, drying chamber in foreground

lated through a heat exchanger and filter. Fixer passes only through heat exchanger. Pumps are of sealless design, consisting of a transparent plastic or glass cylindrical container with motor on top. Shaft connects motor with impeller at bottom of container.

Pipe connection from solution tank is located about half way up along side of pump container and admits enough liquid to fill about half of container. Solution being recirculated enters impeller cavity through bottom of pump and is ejected through side of pump. Impeller's bearing is always submerged in liquid, thereby preventing air leaks and foaming.

The film processor is ca-

For more information on product at left, specify 4032 . . . see information request blank opposite last page.

New H-30 PAYLOADER®

a completely new unit with four-wheel drive

This tractor-shovel is the smallest "PAYLOADER" ever built with 4-wheel drive. In spite of its compact size and modest price, it has the latest improved features and refinements of larger "PAYLOADER" units, and many performance advantages not found in any other machine.

Four-Wheel Brakes: Powerful hydraulic type, and sealed to keep out dust and dirt.

Full Power-Shift Transmission plus torque-converter: Three speed ranges in each direction. All shifts in either direction can be made "on-the-go" with a flick of the fingers — no foot clutching.

Operator Visibility and Safety: New slope-down front end lets operator see bucket-loading action. All moving members are removed from operator's contact. He gets on and off safely with a fixed ladder and hand rails.

Closed Pressure-controlled Hydraulic System: Oil reservoir is closed and pressurized to exclude airborne dirt and dust — includes a cartridge type oil filter and fine-mesh strainer.

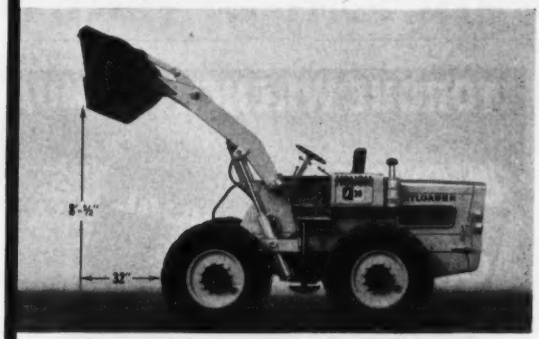
Positive Oil Cooling: Separate fan-cooled oil-to-air radiator assures positive cooling of transmission and torque-converter oil.

Maximum Accessibility: Fuel tank and transmission can be checked and filled from ground level. Easy access to battery, engine and other necessary points.

Your Hough Distributor is ready to give you data on this H-30 or any of the other "PAYLOADER" sizes from 2,000 to 12,000 lb. operating capacity. There's a model to meet your bulk material handling needs, indoors or outdoors. He also has complete service and parts facilities, backed by factory service personnel, to keep your "PAYLOADER" investment profitable.

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

77½ H.P. — 1 cu. yd. bucket . . . 3,000 lb. operating capacity



more power, more reach and more dumping height than any comparable machine

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

THE FRANK G. HOUGH CO.
744 Sunnyside Ave., Libertyville, Ill.

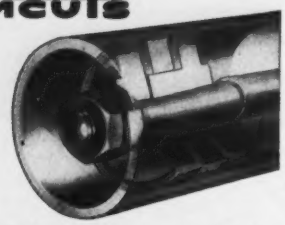
——— Send data on new H-30 "PAYLOADER"
——— Send data on other models and attachments

Name _____
Title _____
Company _____
Street _____
City _____ State _____

3-B-3

Check 4033 opposite last page.

KEEP EFFICIENCY HIGH
with DARCOVA Pumcups



Pumcup designs include the conventional and 45° bevel types in a full range of sizes for all reciprocating pump and cylinder mechanism requirements.

A LOT of dollars go slipping right past the pistons of reciprocating pumps and cylinders that must be frequently repacked. But Darcova Pumcups keep pump efficiency *up*, hold slippage and maintenance *down!*

Because of Darcova's unique design, true texture engineering and precision manufacture, Pumcups outlast other packing at least 3 to 1.

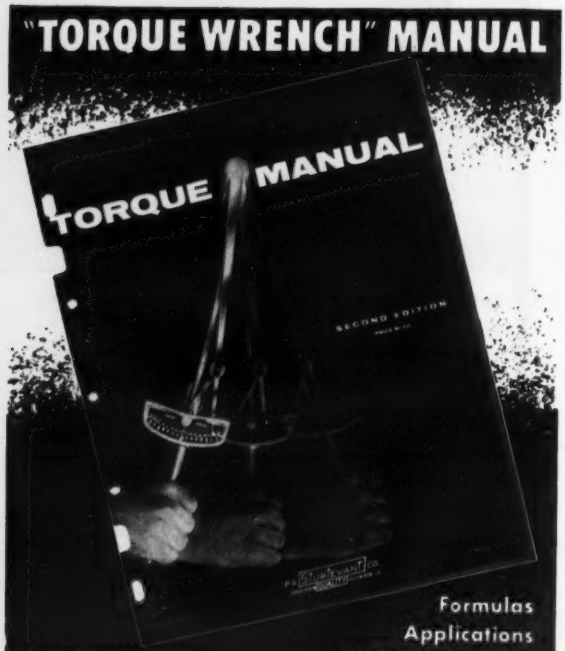
Why not judge for yourself? Get all the facts. Send today for informative Bulletin No. 5903.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.

DARCOVA TRADE MARK Pumcups

Check 4034 opposite last page.

"TORQUE WRENCH" MANUAL



Formulas
Applications
Engineering Data
Screw Torque Data
Adapter Problems
General Principles

SENT UPON REQUEST

PA STURTEVANT CO ILLINOIS
ADDISON QUALITY

Manufacturers of over 85% of the torque wrenches used in industry

Check 4035 opposite last page.

pable of handling a number of sheets of film at a time and over 185 sheets per hour. Only 18 inches of the machine need extend into darkroom. Remaining 5½ feet may be located in lighted area.

Unit is supplied with all accessories necessary for operation. This includes replenisher system and wall-mounted hoist to aid installation and maintenance of processing racks.

(Kodak Model M3 X-Omat processor is product of Eastman Kodak Company, Rochester, New York.)

Check 4036 opposite last page.

Tiny nuclear reactor comparable in size to 5 gal can

Weighs only 220 pounds without shielding

The size of nuclear reactors continues to shrink. Latest device is about the size of a 5-gal can. It weighs 220 lb without shielding and is fueled with enriched uranium.

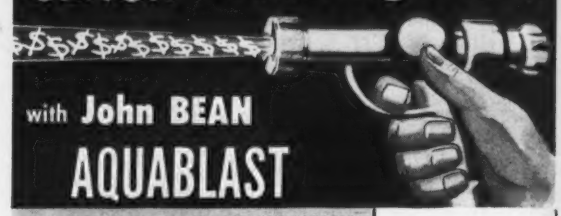
Reactor was built as part of program to develop systems for space vehicles. The prototype unit has been test-operated at design power and temperature. It can generate heat to produce about three kilowatts of electricity.

The unit, known as SNAP (Systems for Nuclear Auxiliary Power), could generate electricity for at least one year in space. It would take the place of several hundred thousand pounds of chemical batteries.

In operation, heat from the reactor would be transferred by a liquid sodium coolant to a boiler containing mercury. Mercury vapor would be directed into a miniature turbine. System would operate on same principle as conventional steam-electric generators except that mercury vapor would be used to drive the turbine.

(Snap experimental reactor was constructed for AEC by Atomics International, division of North American Aviation, Inc., Canoga Park, Calif.)

SLASH washing costs



with John BEAN AQUABLAST

HIGH PRESSURE WASHERS

IS YOUR CLEANING PROBLEM ONE OF THESE...OR SIMILAR?

- Processing tanks
- Metal rust or scale
- Heat exchanger tubes
- Towers, Structures
- Tube bundles
- Vessels
- Chemical residues

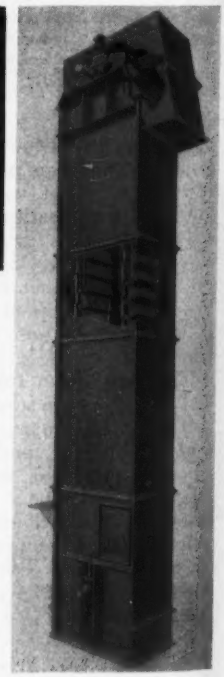
One man with AQUABLAST equals a crew of men using ordinary water pressures. The important difference is that water, discharged at 600 lbs. pressure from an Aquablast gun, cuts through caked dirt, hardened deposits, gummy residues or accumulated grime like magic! John Bean Aquablast Washers are complete, motor driven pumping units for use with 1 to 3 guns.

Send information request form — today!

John BEAN DIVISION OF FOOD MACHINERY & CHEMICAL CORP. INDUSTRIAL SALES DEPARTMENT LANSING MICHIGAN • SAN JOSE, CALIFORNIA

Check 4037 opposite last page.

Lift Your Bulk Materials Economically with . . . Webster BUCKET ELEVATORS



WEBSTER Bucket Elevators can be supplied in practically any capacity and height. Made in centrifugal, perfect or gravity discharge, continuous bucket, and super capacity types. Buckets can be furnished malleable iron, duramal or steel mounted on chain or belt.

WEBSTER Elevators are designed especially for the characteristics of the materials to be handled. All components are manufactured and assembled in Webster plant in Tiffin, Ohio.

Write for Catalog BE-55.

Webster MANUFACTURING, INC.
DEPT. C-30, TIFFIN, OHIO
BULK MATERIALS HANDLING EQUIPMENT
SINCE 1876
Offices in all Principal Cities

Check 4038 opposite last page.

Rock salt upgraded by use of infrared heat waves

Simple, low-cost process solves age-old problem

An efficient, low-cost method for improving quality and appearance of rock salt by separating it from its impurities, whips a problem that has been plaguing rock salt producers for many years.

Based upon diathermic separation, process consists of two main steps: 1) Selective heating by radiation, and 2) Separation of heated particles by use of a heat-sensitive surface. A high-speed conveyor belt coated with a heat-sensitive resin performs actual separation.

After passing under infrared heat, crude rock salt is slid onto the coated belt. Pure rock salt crystals, being relatively cool, shoot off end of belt into catch bin. Impurities stick to belt longer and leave belt with less momentum to drop into bin closer to end of belt than the rock salt bin.

Process takes advantage of different heat-absorbing properties of rock salt and the impurities (anhydrite, dolemite, and shale). Sodium chloride crystals are transparent to infrared heat waves, whereas rock salt impurities absorb infrared heat.

First commercial unit was installed in a Detroit area mine. Results have shown that it can be expanded to almost unlimited capacity. At present, unit is used only to produce one size of salt.

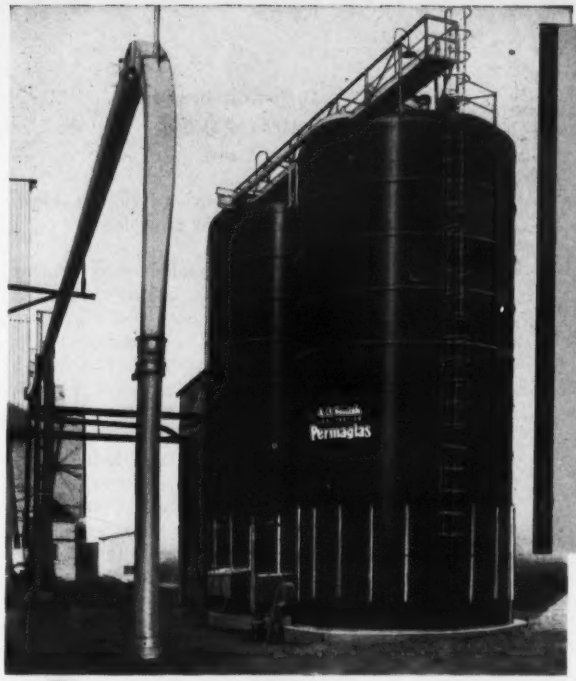
Conventional method of separating rock salt has been through use of differential crushing and screening.

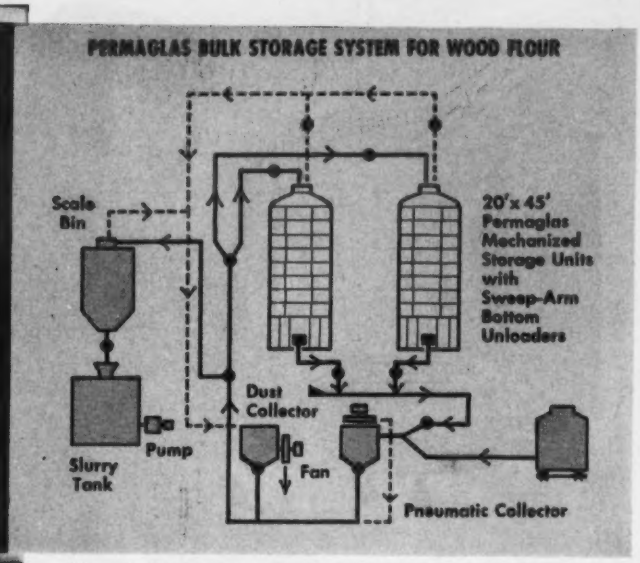
Process is expensive and final product upgrading slight in comparison with new method.

It is believed that the infrared technique may also find use in chemical, metals, food, and other industries.

(Further information about rock salt upgrading process may be obtained from International Salt Company, Inc., Scranton, Pa.)

Check 4039 opposite last page.





Schematic diagram shows pneumatic-vacuum-pressure system for transporting bulk wood flour from railroad cars to two 20' x 45' **Permaglas** Mechanized Storage Units, with mechanical sweep-arm bottom unloaders reclaiming the material from storage to scale bins, and finally into process.

The Ruberoid Co., Joliet, Ill., reports:

"Permaglas® Bulk Storage System paid for itself within 15 months"

The Joliet Illinois plant of the Ruberoid Co., one of the nation's leading manufacturers of dry-felt paper base for asphalt shingles and roofing paper, uses two 20'x45' *Permaglas* Mechanized Storage Structures with mechanical sweep-arm bottom unloaders which discharge tons of wood flour into processing—24 hours a day, 6-7 days a week. Capacity of each *Permaglas* Structure is approximately 100 tons.

Ruberoid reports A. O. Smith's exclusive mechanical sweep-arm bottom unloader made it possible for them to install a completely automatic system because it eliminated the problem of bridging and packing of the wood flour in storage.

This automatic *Permaglas* System paid for itself in 15 months through savings by purchasing wood flour in bulk-loaded boxcars instead of in bags, and in labor handling costs.

Now Ruberoid's Joliet plant enjoys these cost-saving advantages:

SAVING on production downtime because the mechanical sweep-arm bottom unloaders eliminated the problem of packing and bridging. They have been operating nearly continuously for almost 60 months without one penny for repairs.

SAVING on bulk wood flour purchases rather than in bags.

SAVING on labor costs. Savings on total manhours formerly required for handling and transporting of bagged wood flour to storage.

What's more, because of these savings, Ruberoid recently installed a 20'x50' *Permaglas* Structure at its Gloucester City, New Jersey plant, and a 17'x50' *Permaglas* Structure at its Kansas City, Missouri, plant.

Permaglas Storage Structures are glass-fused-to-steel construction both inside and out, assuring completely sanitary, easy-to-clean bulk materials handling systems. They safeguard your bulk materials from infestation. For more details mail coupon today.

Through research ... *a better way*

A.O.Smith
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A. O. SMITH CORPORATION
Permaglas Storage Units, Dept. CP-30
Kankakee, Illinois

Send me free Permaglas Mechanized Storage Unit Bulletin MU-100.

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City.....Zone....State.....

Check 4040 opposite last page.

LECTRODRYER® BUDGET AIR DRYER

supplies small quantities of dry air at low cost

If your requirements for very dry air are relatively small—but highly important—you'll find the new Budget Air Dryer tailor-made for your needs. An investment in large equipment is not needed. The Budget Dryer is modestly priced, easily installed and serviced, operates on any 110 volt a.c. line.

NEW BUDGET DRYER IS IDEAL FOR:

- air-operated instrument controls
- electronic equipment
- small cubicles
- pilot plant operations

This entirely new unit supplies up to 20 cubic feet per minute of air, dried to a dewpoint of −60°F or lower. Operation is completely automatic. Likewise, the unit is as foolproof as possible, operating independently of variations in air pressure. Rugged construction and a long operating cycle assure trouble-free use.

Lectrodryer Budget Dryers are standard units, available from stock, shipped ready for installation. For complete information on this new unit and its low cost, write for Bulletin B6A, Pittsburgh Lectrodryer Division, McGraw-Edison Company, 352 32nd St., Pittsburgh 30, Pa.

Lectrodryer McGRAW EDISON

Check 4041 opposite last page.

Diffusion process extracts sugar from cane

Yields and purity are high, equipment costs low

Higher yields and better purities are being reported with an automated diffusion process for extracting sugar from sugar cane. Extraction of 96 percent of total sucrose is said to be routine. Extractions as high as 98 percent have been reported. Final product yield is from 6 to 8 percent greater than with conventional processes.

Initial investment costs are said to be 25 percent lower than for other extraction processes. Operating costs may be cut by 10 percent. Equipment can be installed outdoors and occupies very little space. The entire operation is automatic and controllable from a central point.

Comparative figures between the diffusion and conventional milling process are listed as follows:

	Diffusion	Milling
Cane analysis		
Sucrose, Wt %	14.0	14.0
Fiber	14.0	14.0
Extraction yield, %	96.0	91.0
Purity, %	86.7	85.0
Bagasse moisture, %	48.0	48.0
Water needs on cane, Wt %		
Fresh	25.0	25.0
Recirculated press water	78.0	....
Analysis, Wt % on cane		
Sucrose	13.4	12.7
Impurities	2.0	2.3
Water	79.9	79.4
Total	95.4	94.4
Total recovered sugar, %	94.0	88.4

How the Process Works

Operation of the continuous diffusion process is as follows: Cane stalks are fed through a cutter that reduces stalks to chips. These are passed over a continuous weighing device, heated, and sterilized with hot sugar extract liquor in a tank.

Resultant slurry is pumped continuously at an automatically controlled rate into bottom of diffusion column. Revolving scroll moves solid material upward in the tower, counter-current to downflowing liquid. When solids reach top of tower, they are mechanically discharged.

Sucrose-exhausted chips, containing approximately 85 percent moisture, are continuously pressed to produce bagasse of less than 50 percent moisture. Water is returned to diffuser.

Extraction of sucrose is done by treating the cane chips with hot water. Extracted solution is concentrated as it moves down the tower. Fresh water, heated to just below boiling point, is fed to top of tower at rate automatically controlled by weight of cane fed to diffuser.

Bulk of water requirements is met by recycling the press water, reheated before entering the tower. The net sugar liquor produced leaves bottom of diffuser at rate controlled to maintain proper liquid level in tower.

Process has been proved in semi-commercial operations in Florida for two crop seasons. Other possible applications are: extraction of oil from cottonseed; tung nuts and pine stumps; washing of paper pulp; and pulp bleaching.

(Further information about Chemetron diffusion process may be obtained from Chemetron Corporation, 840 N. Michigan, Chicago, Ill.)

Check 4042 opposite last page.

Blow-molding on upsurge in U. S.

Availability of domestic equipment big factor

There seems to be a big future ahead for blow-molding — the process that produces "squeeze bottles". Consisting essentially of placing a heated hollow tube of plastic in a mold and inflating it with air until the material sets up in the desired shape, the technique permits economical pro-

duction of many items which were previously considered too difficult or almost impossible to make.

Water pitchers, for example, used to be injection molded in halves and cemented together. Now they are blown in one piece in a single operation. Squeeze bottles were completely unknown until introduction of blow-molding.

One of the big reasons for the boost in popularity in the U.S., is the availability of domestic blow-molding equipment. This has only come on the market within the past year. Units are reported to be more than able to compete successfully with the British and German designs. Recent downward trend in price of polyethylene and other plastic materials has also been a factor.

Tooling Costs Low

Tooling is generally more economical than for other plastic molding techniques. Molds do not have to be complex in design, don't require hardened steel cavities, and can be made of materials which are less expensive than tool steel. Products such as aluminum, Kirksite, beryllium-copper, and conventional carbon steel may be used.

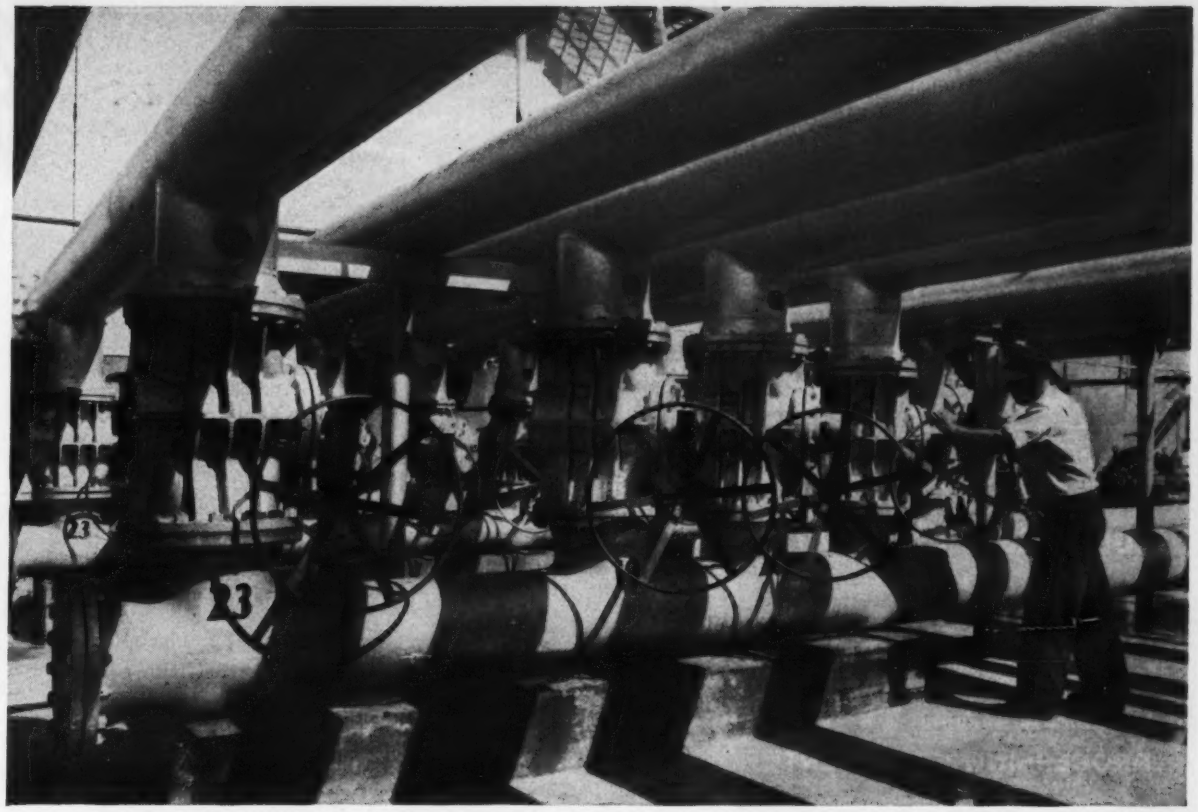
There are other important economies too. For instance, in blow-molding the scrap or flash is fully recoverable and reusable.

A recent report reveals that until 1957 there were only seven companies in this country doing blow-molding. Now there are 80. Next year there will probably be 100 more. Estimates are that by 1965 there may be 1000.

(Further information about blow-molding apparatus may be obtained from F. J. Stokes Corp., Philadelphia, Pa.)

Check 4043 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

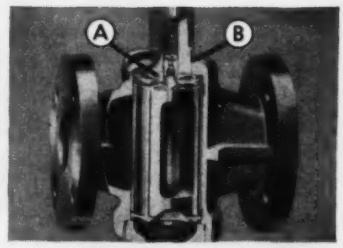


When it comes to quick, efficient control of petroleum products . . .

these Homestead® Lubricated Plug Valves handle 2,000,000 barrels a month!

At the West Coast marine terminal shown above, the tremendous flow of gasolines and oils from storage and tankers demands smooth, positive operation at all times. For this reason, 33 Homestead Lubricated Plug Valves in sizes from 8" to 16" were specified for this installation.

Today more and more oil companies specify Homestead Valves for their dependable, maintenance-free performance and built-in engineering advances. For example, *100% pipe area* reduces ship loading and unloading time. *Pressurized chemical seal* and closely fitted plug and body assure positive shut-off, no mixing of different fluids. *Controlled lubrication* provides full coverage of sealing surfaces without contamination of line fluids. *Quick operation* . . . Homestead Valves are fully opened or closed in a quarter turn of the plug.



Cross-section of Homestead Lubricated Plug Valve. Triple head seal (A) prevents leakage. Tell-tale lubricant ring at (B) signals full system, prevents waste of lubricant and contamination of line fluids.

For complete details and valve recommendations for *your* application, mail coupon below.

Homestead Valve Manufacturing Co. 140
P.O. Box 140, Coraopolis, Pa.

Gentlemen:
Please send reference books on Homestead Lubricated Plug Valves and their uses.

Name.....Title.....

Company.....

Address.....

City.....Zone.....State.....

hv

HOMESTEAD VALVE MANUFACTURING COMPANY
Coraopolis, Pennsylvania

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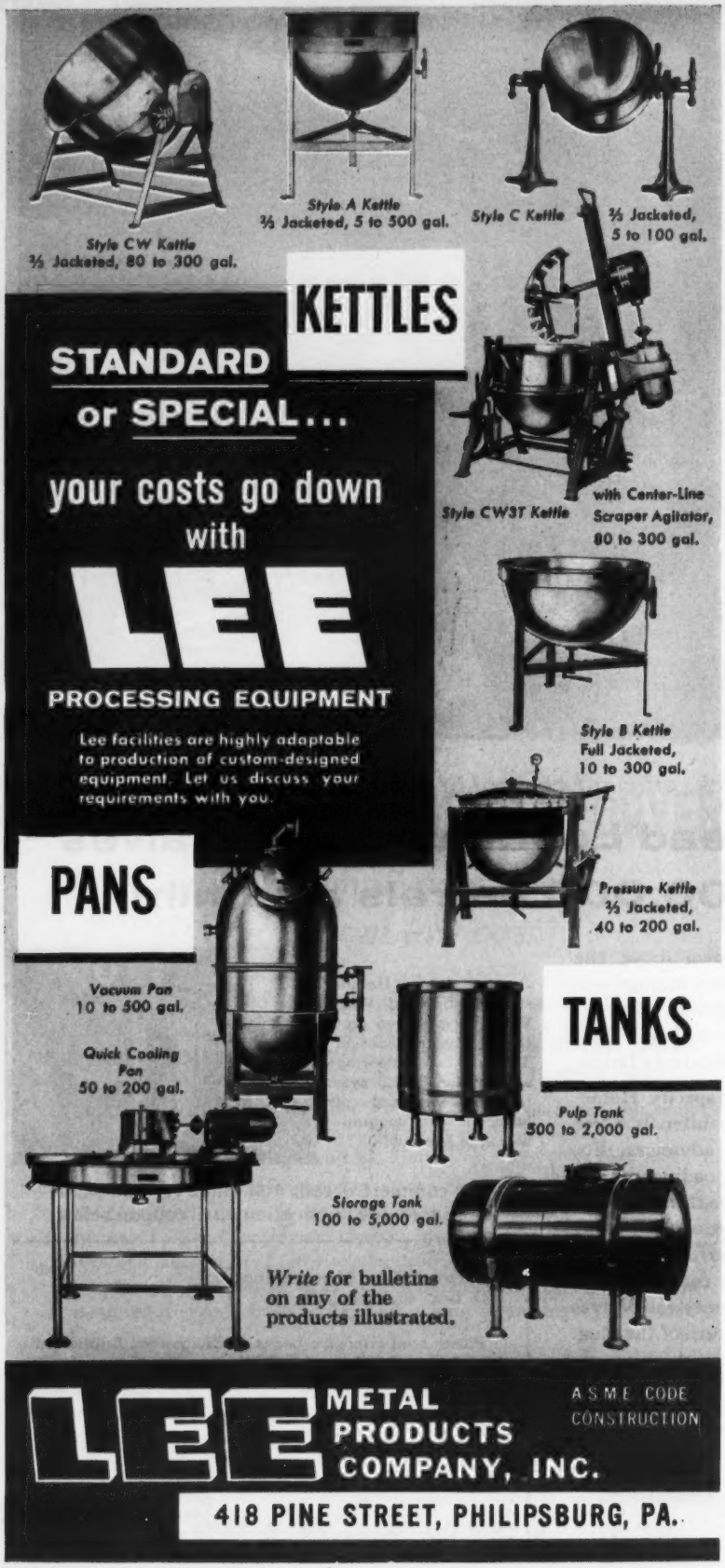


Check 4045 opposite last page.

IDEAS

Rubber made from tin resists heat, flames; may aid space efforts

Alkyl tin methacrylate polymers developed

Tin-derived rubbers — called alkyl tin methacrylate polymers — may prove useful in rocket and missile applications. Products indicate that they are flame retardent, resistant to exotic chemical fuel mixtures, and give dependable performance at high temps.

Tin compounds stretch like rubber and can be vulcanized. At present, however, they are inferior to conventional rubbers with respect to tensile strength and ultimate elongation.

The tin-derived rubber cannot be vulcanized with sulfur and zinc oxide. A mixer of sulfur and dibutyl tin oxide seems to accomplish the desired results.

(Based on paper presented at recent International Rubber Conference by Dr. J. C. Montermoso, Chief of the elastomer branch, Quartermaster Research and Engineering Command, Natick, Mass.)

Continuous rubber mixing and extruding performed by automatic machine

Achieves better control, yields uniform products

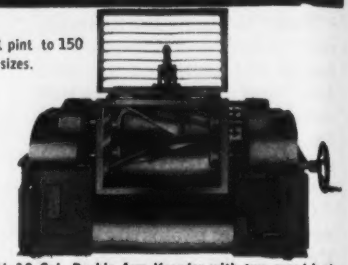
Tire treads, hoses, and other products may soon be formed continuously through use of a recently developed machine. The automatic device can tear up raw rubber, blend it with chemicals and fillers, and force it continuously through a slot to form the products.

Known as the Rotomill, the machine consists of a tapered, corrugated rotor that revolves inside a tapered, smooth shell. A short extruder screw and a die can be added at output end. These permit simultaneous mixing and extruding.

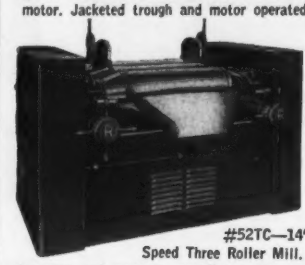
A laboratory model, which has a 3" diam rotor, has already proved to be a useful tool. A 5½" model has also been put into operation and

Leading mfrs. of
Ross
MIXING AND GRINDING EQUIPMENT
for over 90 years

• 1 pint to 150 gal. sizes.



#41L-10 Gal. Double Arm Kneader with two speed brake motor. Jacketed trough and motor operated lift optional.

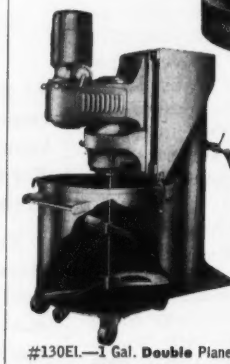


• 4½ x 10, 6 x 14, 9 x 24, 12 x 30, 14 x 32, 16 x 40" sizes.

#52TC—14" x 32" High Speed Three Roller Mill. Hydraulic adjustment and pressure recording gauges optional.

#30C-50 Gal. Heavy Duty Change Can Mixer. Adjustable outer scraper, cover with charging port, and gates on cans optional.

• 8, 16, 20, 50 and 60 gal. sizes.



#130H-250 Gal. Change Tank Mixer with hydraulic raising and lowering and variable speed motor. Various type stirrers and high speed impellers optional.

• 80, 150 and 250 gal. sizes.

#130EL.—1 Gal. **Double** Planetary type Change Can Mixer with shearing action stirrers, and variable speed reversing type motor. Jacketed cans and portable trucks for cans optional.

• 1, 2, 3, 4, 6, 15, 25, 50, 65, 85, 110 and 150 gal. sizes.

Also Dry Crushing and Pulverizing Mills, Hopper Mills, High Speed Dissolvers or Dispersers, and Mixers of all types for dry, liquid, paste, or heavy paste materials.

Write for complete information!

CHARLES ROSS & SON COMPANY, INC.

154 CLASSON AVE., BROOKLYN 5, N. Y.

Check 4046 opposite last page.

can produce 100 pounds of tire tread stock per hr.

Output is proportional to speed at which the device operates. This is limited however, by the amount of heat generated in the mixing operation. Cooling water can be circulated through core of rotor and jacket of shell.

For continuous operation the ingredients to be mixed must be in a form which can be weighed continuously. In connection with this, a separate feeder for each ingredient has been found to be the best practice.

(Based on paper presented at recent International Rubber Conference by A. E. Juve, B. F. Goodrich Company, Goodrich Research Center, Brecksville, Ohio.)

AEC spends $2.5 billion for total operations in FY 1959

Costs increase nine percent over previous year

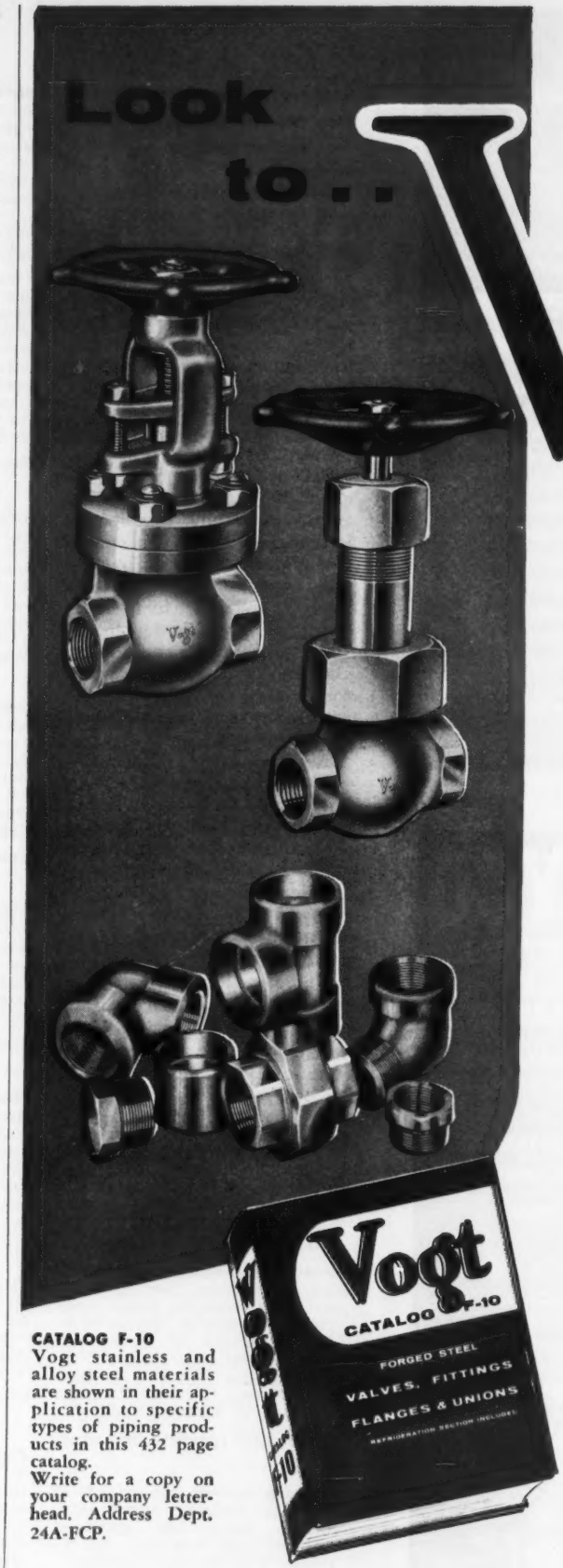
Financial summary published by AEC indicates that fiscal year 1959 net cost of operations amounted to $2.5 billion. This is an increase of 9% over 1958.

Reactor development costs totaled $356 million of which $105 million was for development of specific civilian reactor concepts for stationary power use. Cost of entire reactor research and development effort increased 16% over previous year.

Sales value of nuclear materials leased to domestic organization and foreign governments amounted to $72 million, a boost of $48 million. Radioisotope sales amounted to $2.5 million.

During the year, prices were cut for many radioisotopes. For example, price of carbon-14 was reduced by 50%. Operating contractor employees numbered 105,195 at June 30, 1959. This is an increase of 1905 over previous year.

(Information courtesy of U.S. Atomic Energy Commission, Washington 25, D. C.)



CATALOG F-10
Vogt stainless and alloy steel materials are shown in their application to specific types of piping products in this 432 page catalog.
Write for a copy on your company letterhead. Address Dept. 24A-FCP.

Vogt

FOR FORGED STAINLESS AND ALLOY STEEL

Valves, Fittings and Unions

IN STOCK AND READY TO GO!

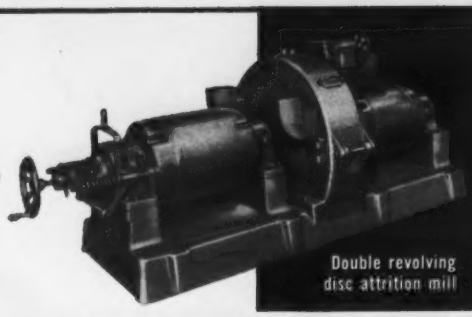
BE SURE to consult the new Vogt Catalog F-10 when in need of top quality forged stainless and alloy steel piping products for severe operating conditions.

The complete Vogt line includes sizes and types to fit your process requirements with high resistance to corrosion, complete freedom from product contamination, and long service life.

HENRY VOGT MACHINE CO.
Louisville 10, Ky.

SALES OFFICES:
New York, Chicago, Cleveland, Dallas, Camden, N.J., St. Louis, Charleston, W.Va., Cincinnati

Check 4047 opposite last page.



Bauer MILLS

Double revolving disc attrition mill

For Granulating and Pulverizing

No matter what material or product you have to grind, granulate or pulverize, Bauer offers size reduction equipment that may do the job for you most profitably...and to the degree of fineness you require.

It might be plastics, chemicals, rubber, wood scraps, food products or even rare metal ore from the moon. Whatever it is, chances are we have field and research data on hand that will save you time and money. If we don't, our testing laboratories will get it for you.

The full line of Bauer mills is shown in Chemical Engineering Catalog and our Bulletin No. 59. Send for a copy today.

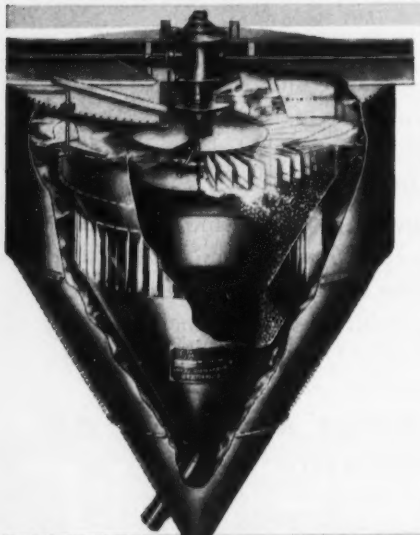
Bauer processing equipment:

- Attrition mills
- Breakers
- Crushers
- Hammer mills
- Laboratory mills
- Granulators
- Texturizers
- Fiberizers
- Cleaners
- Classifiers
- Specific gravity separators

THE BAUER BROS. CO.
1728 Sheridan Ave., Springfield, Ohio

Check 4048 opposite last page.

USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR



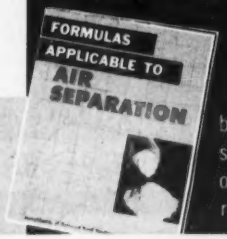
GAYCO
CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:

- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy Duty Models.



this helpful booklet sent on request

Robert M. Gay Division
UNIVERSAL ROAD MACHINERY CO.
117 Liberty St., New York 6, N. Y.
Factory and Laboratory: Kingston, N. Y.
In Canada: Watson-Jack Hopkins Ltd., Montreal

Check 4049 opposite last page.

Commercial chemicals may be manufactured by nuclear reactor

Concept makes efficient use of fission recoil energy

Nuclear reactors may soon be used to produce commercial chemicals. Preliminary studies indicate that a new reactor concept, in which fragment recoil energy is utilized, might manufacture ethylene glycol, for example, at a cost competitive with conventional glycol processes.

Recoil energy constitutes about 80% of the total fission energy. Normally, this energy is absorbed in the fissionable fuel and its container. In certain types of reactors with finely divided fuel, this energy is available for chemical transformation. After chemical synthesis, most of the energy is still available for electrical or thermal power generation.

Reaction could be applicable to wide range of organic chemicals. Studies have shown that chemicals of lower molecular weight tend to give higher yields of easily separable products. Yields of over 65% of ethylene glycol have been obtained from methanol.

(Reactor concept was developed by Hercules Powder Company, Wilmington 99, Delaware.)

NEW LITERATURE
Ideas and New Trends

Economic advantages and usefulness of vacuum forming as a method of producing plastic products are discussed in 20-page booklet. Photographs of various finished products are included. "Vacuum Forming" — Plastics Division, Eastman Chemical Products, Inc., Subs. of Eastman Kodak Co.

Check 4050 opposite last page.

Finishing systems are subject of four-page bulletin. Spray guns, coaters, ovens, and associated equipment are described. Bul F-325 — The Devilbiss Company.

Check 4051 opposite last page.

Improved sugar clarifier, its design and operation, is explained in 10-page color booklet. Engineering cut-away drawings are included. Bul WC-125 — Graver Water Conditioning Co., Division of Union Tank Car Company.

Check 4052 opposite last page.

Science fairs — and how to conduct them — are topic of six-page illustrated brochure. Literature provides information about organization, preparation of exhibits, ideas for students' projects, and standards for judging and awards offered. Science Fair Brochure — The Canadian Science Fairs Council.

Check 4053 opposite last page.

Sodium, heavy-water reactor concept is evaluated in 36-page report. Technical feasibility and potential for economical production of electric power is discussed. Report TID-8515 is available for 50c from Office of Technical Services, U. S. Department of Commerce, Washington 25, D.C.

Progress in food processing and materials handling is subject of 20-page bulletin. Emphasis is placed on role that spray dryers, coolers, and vacuum fillers are playing in dairy and juice fields. "Progress in Food Processing" — Mojonnier Bros. Co.

Check 4054 opposite last page.

Sodium zeolite process of water softening is reviewed in illustrated manual. Automatic versus manual controls and calculations of softening capacity are discussed. "Sodium Zeolite Softeners" — Cochrane Corporation.

Check 4055 opposite last page.

Plant location services available to industry are outlined in six-page, pocket-size folder. Illustrations depict favorable characteristics of Upstate New York. "Plant Location Services" — Niagara Mohawk Power Corporation.

Check 4056 opposite last page.

Plastic extruders, casting roll units, take-up equipment and accessories are featured and described in four-page bulletin. "Modern Thermoplastic Extrusion Equipment" — Modern Plastic Machinery Corp.

Check 4057 opposite last page.

Paper making process is illustrated in eight-page panoramic folder. Operations from logging through to finishing room are shown. Bul PP-100 — J. O. Ross Engineering, Division of Midland-Ross Corporation.

Check 4058 opposite last page.

Output Up 250%, Costs Cut With Net-weighing Device

Low-cost weighing and bottling set-up streamlines former manual operation

Problem: Weighing and feeding pharmaceutical preparations into bottles was a tedious, time-consuming manual operation at Morse Laboratories, Hoboken, N.J., manufacturer of antibiotic specialties for private labels.

Total output of seven persons in department averaged 1000 bottles per seven-hour day. Material was apportioned into paper on scale with spoon or spatula until desired weight was attained. Often this required numerous additions or removals of material being weighed before exact weight could be attained. Paper was then emptied into bottle.

Several types of equipment to speed the job were investigated, but either cost was too high or performance inadequate.

Solution: A low-cost net-weighing device has been installed. It consists of a two-cu-ft hopper supplying a vibratory feeder which delivers material to actual weighing device.

End of feeder trough is positioned directly above small bucket which is affixed to end of scale beam. Scale is modified form of Harvard trip balance. Bucket has electro-mechanically operated door latch and door closer.

Control box, located on upper righthand side of scale frame, contains two adjustable Variac-type transformers, control switch and checkweighing switch. A chassis houses three relays, thermal delay tube, fuse, and various plug-in cable connectors.

When the tare side of scale is down and power on, vibrator feeds material into scale bucket at rate controlled by setting of fast Variac. As weight in bucket approaches required level, scale beam begins to move, actuating microswitch which through relays transfers control of feeder from fast to slow Variac. This decreases rate of flow from vibrator until scale reaches balance, at which time a mercury switch located on scale beam, through relays, cuts off power and stops the feeder.

If set for automatic operation, a door-latch magnet releases bucket door and material is discharged. Scale then returns to "down on tare" side which actuates door-closer electromagnet. Closing and latching of door, in turn, signals microswitch to close power circuit to vibrating feeder, and complete weighing cycle is repeated.

When bucket door is not properly latched, a signal is sent through thermal delay tube and the door-closing and latching operation is repeated after two-second interval. This sequence is duplicated until obstruction is removed.

Difference of one gram can swing scale from "down on tare" to "down on bucket" side. However, 150 mg will pass necessary information to the scale for it to function in shutting off. An "anticipator" compensates for amount of material in air, permitting 99% of a weighing to be fed at rapid rate. This compensation can be varied by adjusting micrometer screw on scale base assembly.

Accuracy of weighing is controlled by speed and amount to be weighed. Five grams, lower limit of scale, requires more weighing time than does 3 to 8 ounces at same accuracy. However, pound takes more time to weigh than does 3 to 8 ounces, due to limit on quantity of material that can be handled by the equipment.

Results: With net weighing device, four persons are weighing and filling 2500 bottles with 33 to 40 g of pharmaceutical preparations in seven-hour day —a 250% increase in production with 43% decrease in labor requirements.

Accuracy is $\pm\frac{1}{2}\%$, which is more than adequate for user. Initial investment was more than recovered in less than a year through higher production and lower labor costs.

(Exactromatic net-weighing device is product of Exactron, Inc., Prospect and W. Madison Aves., Dumont, N.J.)

Check 4059 opposite last page.

(HI-VI vibratory feeder is manufactured by Eriez Manufacturing Company, Erie 6, Pa.)

Check 4060 opposite last page.

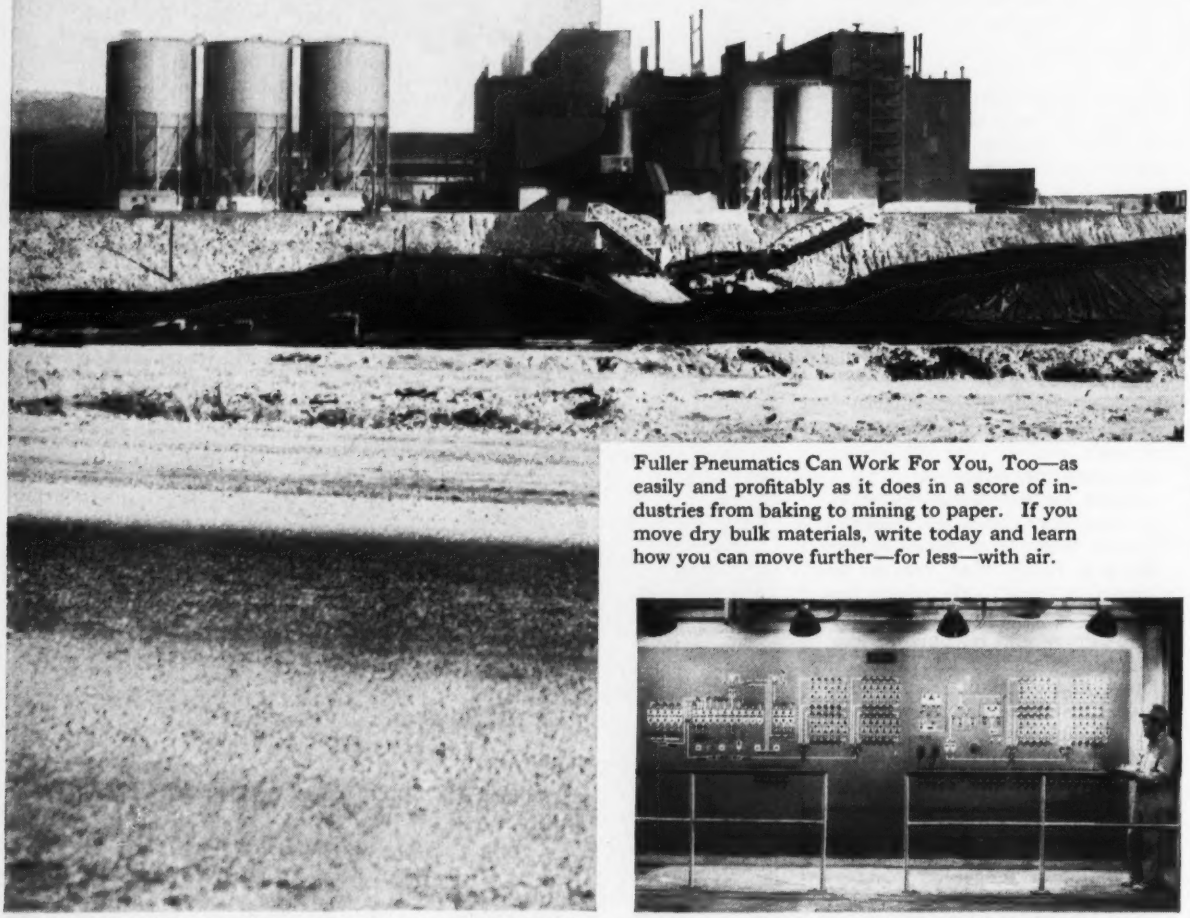
Automatically weighed to $\pm\frac{1}{2}\%$ accuracy, pharmaceutical preparations here are being emptied from net-weighing device into scoop. Use of unit has supplanted manual weighing, increasing bottling output from 1000 to 2500 daily

How Pneumatic Conveying Helps Make New Mining Process Economically Practical

Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy.

Fuller Pneumatic Conveying Systems are carrying fine anthracite screenings, soda ash, and bentonite from siding to storage to processing—with speed, safety, sanitation, and efficiency. With few moving parts to wear out and powered by inexpensive low-pressure air, Fuller Pneumatic Conveying Systems speed dry bulk materials *anywhere that a pipeline can be run:* under ground, up through floors, around corners . . . for far greater distances and at substantially lower cost than possible with mechanical conveyors.



Four Fuller Pneumatic Systems can speed more than 307 long *tons* of additives through this huge Taconite Pelletizing Plant in a single day.

Fuller Pneumatics Can Work For You, Too—as easily and profitably as it does in a score of industries from baking to mining to paper. If you move dry bulk materials, write today and learn how you can move further—for less—with air.

Centralized control is provided by giant panel designed and manufactured by Fuller.

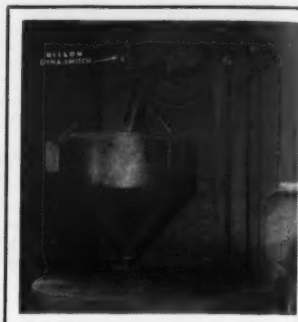
See Chemical Engineering Catalog for details and specifications.

FULLER COMPANY
136 Bridge St., Catasauqua, Pa.
Subsidiary of General American Transportation Corporation
Offices in Principal Cities Throughout the World

Fuller
. . . pioneers in harnessing AIR

2097
G229

Check 4061 opposite last page.



Deflection switch sets hopper weight cycle

Production Pattern & Foundry Company, Chicopee, Mass., uses the above set-up to weigh out batches of foundry sand automatically. Weigh hopper is suspended directly from Dyna-Switch, a U-shaped deflection beam loaded by means of eyes attached to opposite sides. As beam deflects outward, it trips related switches at precise load points.

At the foundry, elevator in right background drops the sand into hopper through connecting pipe. At preset load point, elevator stops and hopper gate opens. Time-delay relay holds gate open until hopper is empty. Cycle then repeats itself. Operational point of Dyna-Switch can be quickly adjusted to suit changing conditions.

(Dyna-Switch is a product of W. C. Dillon & Company, Inc., 14620 Keswick St., Van Nuys, California.)

Check 4062 opp. last page.

Opens bags, hangs them on filling-machine spout

Does away with need for bagger operator

Uses: Supplies empty open-mouth multiwall bags to filling machine and places them on loading spout. Handles broad range of bag sizes in either gusset or tube type.

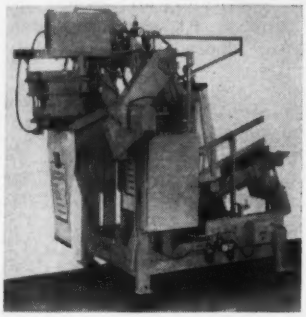
Features: Eliminates need for bag-filling operator. Speeds, governed entirely by automatic bagger with which this automatic bag hanger is interlocked, range up to 25 bags a minute.

Description: Unit is adapt-

able to all Union I & C bagger models. To operate, any quantity of bags up to 400 is placed upright in magazine, with thumb notches forward.

Sensing switches at both top and bottom of leading bag keep it always in position to be removed. Bags are moved forward at the top by pressure from a follower and on either side by elongated sprockets.

Curved "picker" opens leading bag by using thumb notch. Rotating arms then approach bag, and fingers on the arms move inside. Arms stop momentarily and separate until fingers are snug. Then sufficient pressure is applied to move bag from magazine to loading spout.



Automatic bag hanger for multiwalls

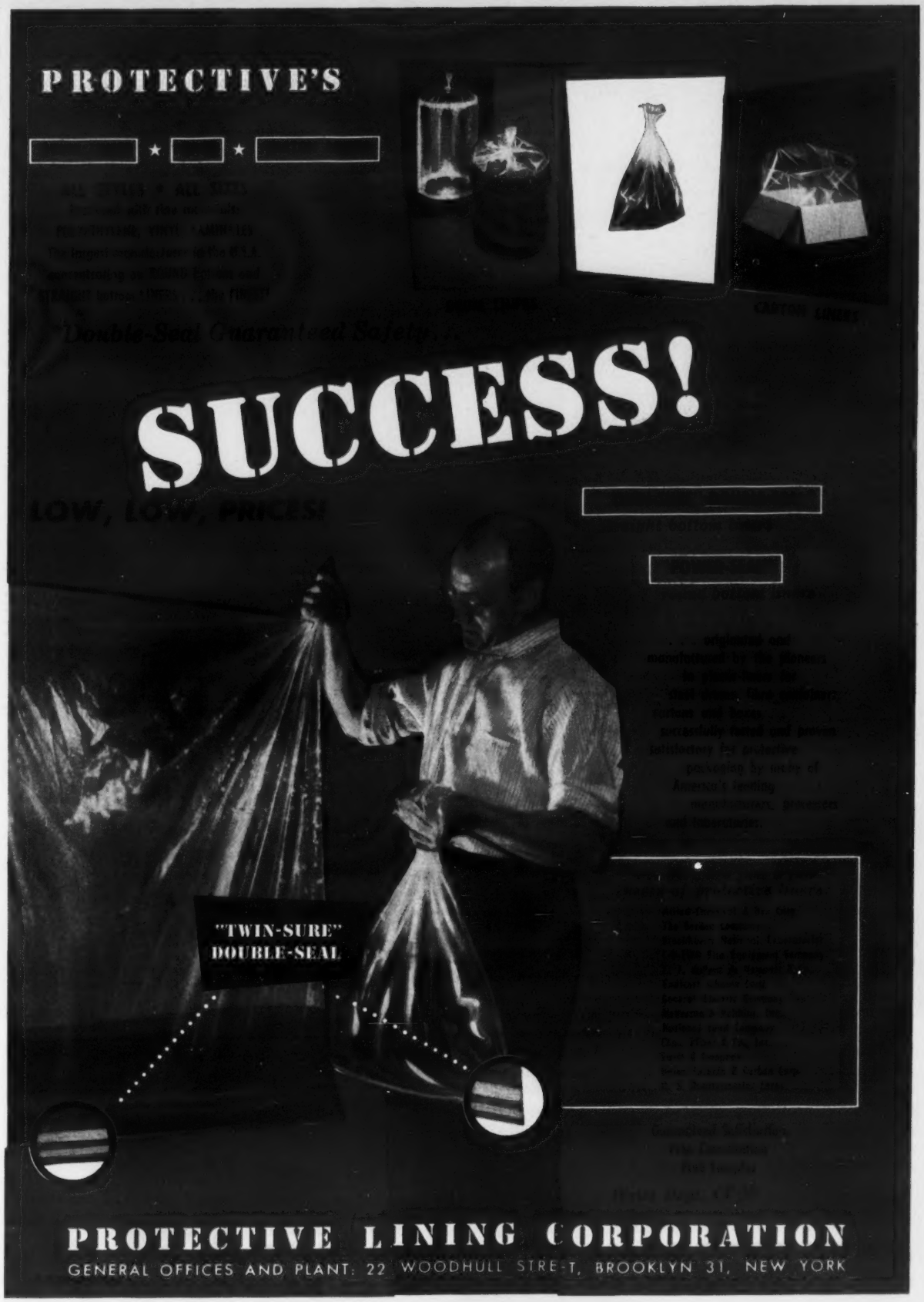
As preceding bag is filled and released from loading spout, the arms simultaneously rotate and place empty bag on spout.

(Automatic bag hanger is a development of Union Bag-Camp Paper Corporation, 233 Broadway, New York 7, New York.)

Check 4063 opposite last page.

NEXT MONTH

Advantages that Onyx Oil & Chemical found in use of lined fiber drums for liquid, pasty, and also dry materials that must be protected against contamination and moisture will be reported in this section in April. Such aspects as freight and bookkeeping cuts, container-cost comparisons, handling and storage will be covered.



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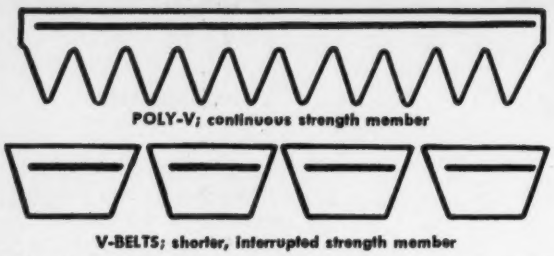


"MORE USE PER DOLLAR"

Poly-V Belt is a single unit with even, uniform pull. Uninterrupted strength member gives much higher hp capacity per inch of drive width. No belt drive delivers as much power in the same space as Poly-V!

THIS R/M POLY-V® DRIVE OUTLASTED V-BELTS 8-1!

V-belts were replaced every six months on this gas pump drive in a southern chemical plant—until the company converted to R/M's patented Poly-V Drive. The single Poly-V Belt pictured above has been in operation for over 4 years on a barium process operation. Four years for the R/M Poly-V Drive versus 6 months for an ordinary V-belt drive! The savings and advantages to production are obvious.

R/M Poly-V Drive solves difficult drive problems wherever heavy duty power transmission is required. Single unit design permits *narrower* Poly-V sheaves to deliver *equal* power in a much smaller space or much *more* power in the same space as a V-belt drive! The drive runs smoother because there's no sinking of belt in sheave grooves. Belt speed ratios remain constant from *no* load to *full* load for uniform power delivery—with less wear on belts and sheaves. V-belt "length matching" problems are completely eliminated . . . and just two belt cross sections meet every heavy duty requirement. Let an R/M Distributor show you other advantages of converting to R/M Poly-V Drive. Write for Bulletin M141.

- More Power—Less Space
- Eliminates "Matching" Problems
- Maintains Groove Shape
- Assures Constant Speed Ratios
- Longer Belt and Sheave Life
- Cooler, Smoother Running

RM1010

When You Change Drives, Convert to Poly-V and Be Sure!

RAYBESTOS-MANHATTAN, INC.
MANHATTAN RUBBER DIVISION, PASSAIC, NEW JERSEY

RM ENGINEERED RUBBER PRODUCTS ... MORE USE PER DOLLAR

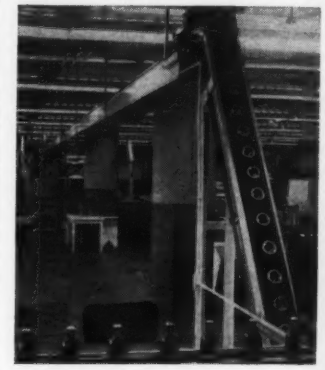
Check 4065 opposite last page.

Filling line more efficient with conveyorized return of bottle-holding pucks

Magnetic belt carries them up 60° incline to overhead

"Magnetic automation" has replaced outmoded handling by pushcart in a packaging line at the Suffern, N. Y., plant of Avon Products, Inc. Result is faster production, better labor utilization and less floor congestion.

The containers are held upright in aluminum or plastic pucks as they move along through filling and closing operations. At cartoning step, these loose pucks are removed from the line and must be returned to head of line where they meet the empty bottles again. It is here that magnetism stepped into replace the handcart.



Magnetic belt (right) carries pucks nine feet up 60° incline

Each puck has a metal ring in the base. This permits it to be carried up a 60° incline by a belt conveyor with permanent magnets (called Magna-Rails) underneath. This nine-foot belt carries the pucks to an overhead 62'2"-long, 12"-wide conveyor belt operating at 50 fpm.

(Magnetic system was designed and installed by M-H Standard Company, Jersey City, N. J.)

Check 4066 opposite last page.

(Magna-Rails are made by Eriez Manufacturing Company, Erie, Pa.)

Check 4067 opposite last page.

WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's CHEMICAL PROCESSING are important! We *welcome* your letters expressing your views. Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in CHEMICAL PROCESSING, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

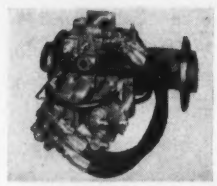
If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column. (See page 15.)

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware Place, Chicago 11, Illinois

For more information on product at right, specify 4068 see information request blank opposite last page.

PLANNED MASS-HANDLING

Your immediate attack against rising costs



IT'S A FACT: The unique Towmotor Towmostatic Drive guarantees handling flexibility, smooth operation and maintenance benefits far greater than any other fork truck drive.

YOUR SHORTCUT TO EXTRA PROFIT is through planned mass-handling that puts the right equipment in the right place at the right time. Integrating TOWMOTOR fork lift trucks into your production operation is the fastest way to lower costs and increase your profits. Write for case studies that show you how companies similar to yours are reducing costs through more effective handling operations. TOWMOTOR CORPORATION, CLEVELAND 10, OHIO.

FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

TOWMOTOR THE ONE-MAN-GANG® -GERLINGER

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

EASY SEPARATION

Another Advantage of SANDVIK Steel-Belt Coolers

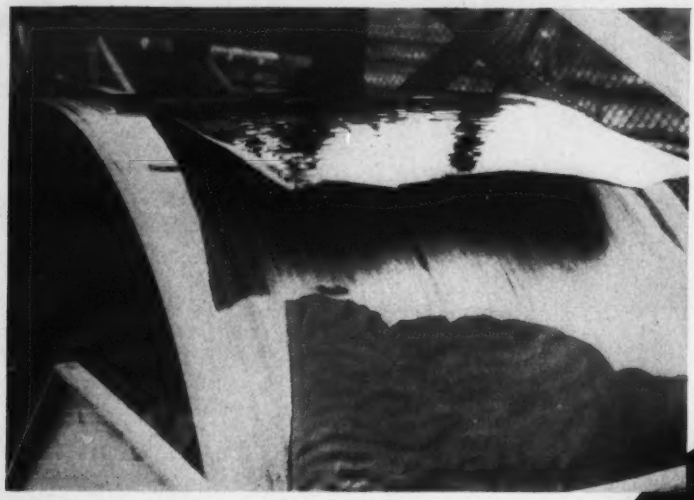
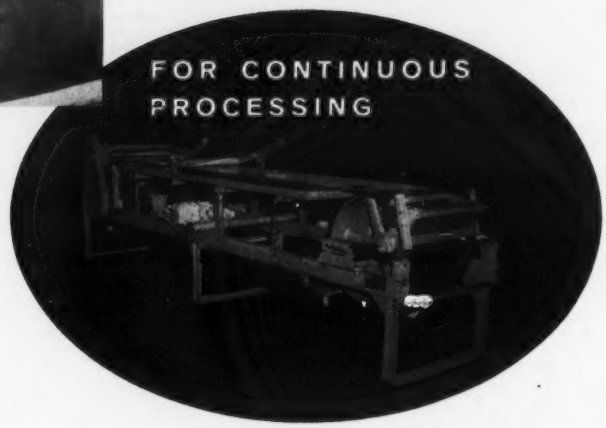
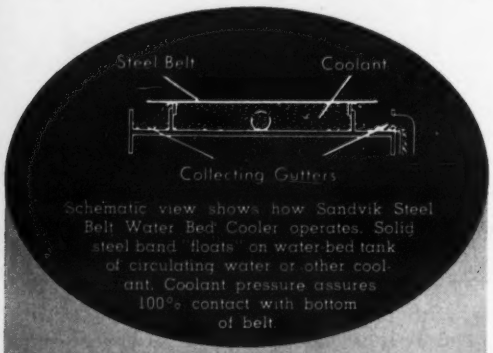


Photo shows how most materials cooled and solidified on the flat, horizontal surface of Sandvik steel belt separate easily at point where belt curves around pulley, even without the use of scraper blades.



Easy separation is just one of the many advantages that the Sandvik steel belt cooler provides for continuous processing of hot chemicals.

This patented unit is being successfully used to cool a wide variety of materials with feed temperatures up to 1900° F. On some applications capacities range as high as 25 tons per hour. It is used to cool and convey, regulate thickness while cooling, control temperatures in specified zones along the belt, cool materials in layers, cool loose materials, cool and strip off gelatinous materials in sheet form and many other operations. The belt can be hooded for humidity control of hygroscopic materials. Crystalline materials can be seeded or agitated on the belt at the correct temperature zone.



Schematic view shows how Sandvik Steel Belt Water Bed Cooler operates. Solid steel band "floats" on water-bed tank of circulating water or other coolant. Coolant pressure assures 100% contact with bottom of belt.

SOME TYPICAL EXAMPLES OF MATERIALS BEING COOLED ON SANDVIK WATER-BED COOLERS

Aluminum Sulphate
Ammonium Nitrate
Asphalt
Coal Tar Pitch
Chlorinated Wax
DDT
Gelatine
Maleic Anhydride
Phosphate Glass
Phtalic Anhydride
Polyethylene Wax
Resins:
(Hydro Carbon
Epoxy
Vinyl
Synthetic
Wood Rosins)
Sodium Metasilicate
Sulphur
TNT
Triphenol Phosphate
Zinc Nitrate
And Other Materials

Sandvik can supply cooling data on a wide range of materials. Sandvik also has portable, experimental cooling units available on which you can make small scale trials in your plant. Write or phone for further details.

See Pages 552 & 553, Chemical Engineering Catalog.

SANDVIK STEEL, INC.

Steel Belt Conveyor Department
1702 Nevins Road, Fair Lawn, N. J.
SWarthmore 7-6200
Cleveland • Detroit • Chicago • Los Angeles
IN CANADA:
Sandvik Canadian Ltd., P.O. Dr. 1335, Sta. O., Montreal 9, P. Q.

SANDVIK STEEL BELT CONVEYORS

Check 4069 opposite last page.

Collapsible box

. . . in one piece, including lid, saves valuable space in empty return or storage. Lift-truck forks can enter under stacking foot from all four directions to handle boxes singly or stacked. Box is made of strong, lightweight Vulcaneer fiber-armored plywood. Edges are reinforced with metal moldings. Components are firmly hinged together with piano-type hinges.

Four standard sizes are available: 24 x 19 x 12″, 32 x 24 x 19″, 48 x 24 x 19″, and 48 x 32 x 24″. Special sizes are available up to maximum length of 60″ and maximum weight, for standard construction, of 300 lb for single box or 1000 lb in any one stack of boxes.

(Kennett collapsible boxes are product of National Vulcanized Fibre Co., 1059 Beech St., Wilmington, Del.)

Check 4070 opposite last page.

"Yup, there goes the boss, checkin' the tanks."

Handling Resins in Bulk Saves 23,000 Manhours/year for Dobeckmun

Other advantages are release of floor space and freedom from contamination

Problem: Purchase, unloading, storage and inplant handling of bag and small-drum lots of polyethylene molding compounds was an expensive proposition for The Dobeckmun Company, Cleveland, Ohio, a Division of The Dow Chemical Company. As production climbed, it became clear that a more efficient method was needed . . . at least for the resins used the most.

Each separate extruder, producing plastic packaging films and bags, had to be kept supplied with bags or drums of resin. Close quarters made it hard for industrial trucks to navigate throughout the plant and around the extruders.

Solution: Dobeckmun switched to bulk purchase of the resins used in largest amounts. They are now received in collapsible rubber containers (Sealdbins) by truck and railroad. As many as 30 of these containers, each holding roughly 10,000 lb, can be stored side by side in the yard, without regard to weather conditions, ready for

Collapsible container has just been put onto cradle from which it empties to pneumatic conveyor. Lift truck for handling this type of container is at left

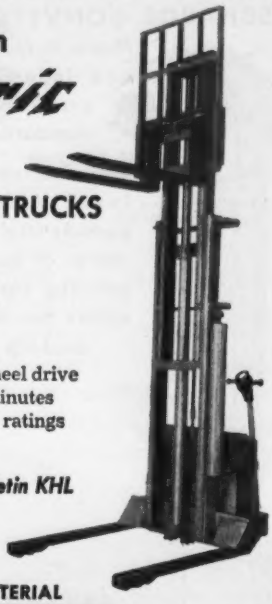
modernize with
HydroLectric

A GREAT NAME IN LIFT TRUCKS

- Two driving wheels instead of one
- Braking with handle in any position
- Automatic parking brake (optional)
- Sealed alloy gears instead of chains
- Sealed ball-bearing rollers in masts
- 100% more steering ease with two wheel drive
- Power unit removal complete in 20 minutes
- Greater tire capacity equivalent load ratings

LIFT TRUCKS INC. W.W.W. STUEBING CINCINNATI

• Write for Bulletin KHL



A TRUCK FOR EVERY PURPOSE AND MATERIAL

LIFT TRUCKS, INC.
CINCINNATI 14, OHIO

Check 4071 opposite last page.

FISCHBEIN Portable BAG CLOSER
MODEL CR

AIR OPERATED

Recommended for use in areas where explosion-proof electrical equipment would normally be required.

• Requires no installation, supports or plant space . .

• Power transmitted by fibre gears that require no lubrication.

• Handles textile and paper bags.

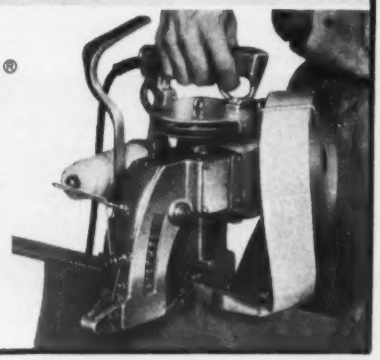
• Weighs only 9½ lbs.

Available with or without
FISCHBEIN FASEAL®
Tape Binding Attachment

Produces perfect tape-bound closures. Complete portability maintained. Attachment can be quickly removed when tape binding is not required.

For details and complete catalog file of Fischbein Bag Closing Equipment . . . write. . .

DAVE FISCHBEIN CO.
2720 30th Ave. S., Dept. 98, Mpls. 6, Minn.



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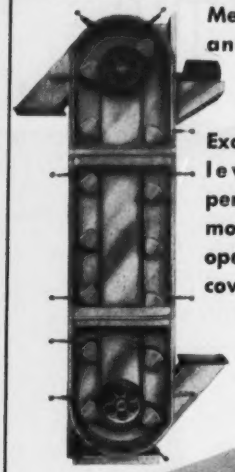
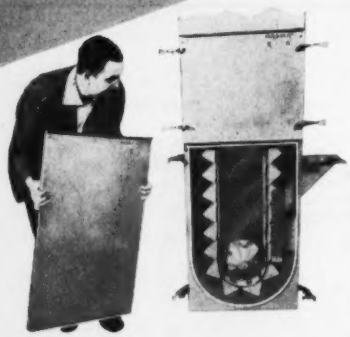
SANITARY CENTRIFUGAL DISCHARGE CONVEYOR



Meets Municipal and Industrial sanitary standards.

Exclusive cantilever design permits total removal of quick-opening casing covers for easy cleaning.

Write today for NEW FREE CATALOGS on Bulk Material CONVEYOR ELEVATORS for Process Industries



SANITARY CONTINUOUS DISCHARGE CONVEYOR

Overlapping buckets provide gentle product handling.

Loading is direct into buckets.

Discharge is by gravity.

buck-el CONVEYOR ELEVATOR

product of

THE BUCKET ELEVATOR CO.

57 Union Place

Summit, New Jersey

See CEC catalog for immediate reference.

Check 4073 opposite last page.

efficient and almost immediate use.

As demanded by process, the containers are placed on "cradles" which hold them while they empty into a pneumatic conveying system. This system carries the resins to individual taps above the feed hoppers of the various extruders. Empty containers are folded up and shipped back to resin suppliers every week.

A big factor in making this kind of system work effectively is the lift truck adapted to handling the Sealdbins. This unit carries the containers between storage and the "cradles" as extrusion runs are changed and different resin types or grades are required.

This truck has a boom which travels up and down a tilting mast. A round, pointed "bayonet" at the end of this boom engages the strong eyelet attached to the top of each Sealdbin. Guides at each side of bayonet aid engagement into the lift eye.

Results: Jack Cleary, Dobeckmun's chief industrial engineer, figures the bulk-handling method saves 23,000 manhours a year—about 440 a week!

Because of reduced handling of the raw material, over-all plant efficiencies are increased. In addition, freedom from contamination and release of floor space for other purposes—to mention just two advantages of this method—result in appreciable savings.

(Liftruk Sealdbin handler is made by Silent Hoist & Crane Co., Inc., 841-877 63rd St., Brooklyn 20, N.Y.)

Check 4074 opposite last page.

(Sealdbins are product of United States Rubber Company, 10 Eagle Street, Providence 1, R.I.)

Check 4075 opposite last page.

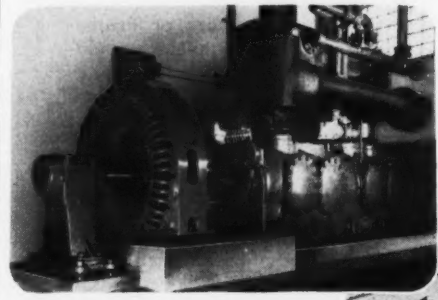
For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

No name among American makers of cooling equipment stands higher or has endured longer than that of Frick.

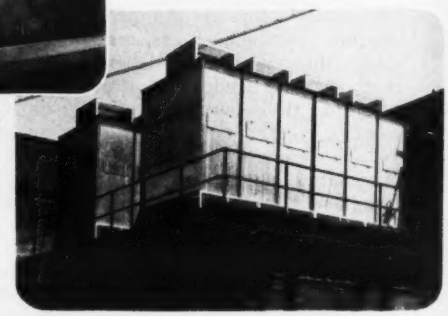
Back of the Frick trademark are 107 years of experience in engineering, 78 in refrigeration and ice making, and 55 in air conditioning. You get the value of this priceless experience when you invest in dependable Frick equipment.

Write, wire or phone now for catalogs and estimates.

FRICK COMPANY,
Waynesboro, Penna.

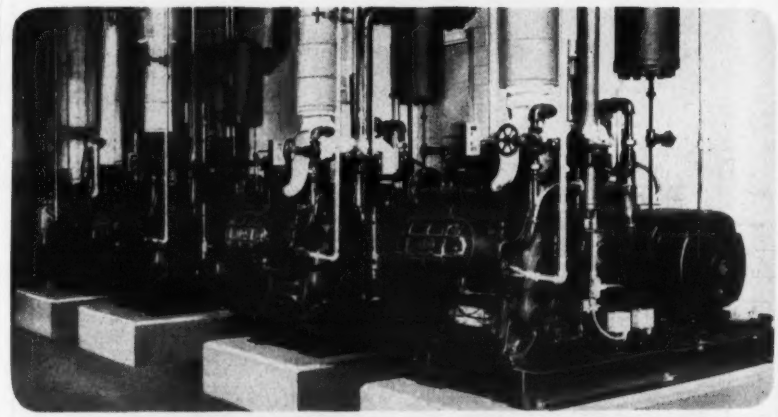


ABOVE—Frick heavy-duty compressors are the standard of the world for industrial work. Ask for Bulletin 112.



RIGHT—These Frick evaporative condensers are saving $1.000 per month. See Bulletin 235.

BELOW—Frick "Eclipse" compressors have 2, 3, 4, 6 or 9 cylinders, offer speeds up to 1200 r.p.m. See Bulletin 100.

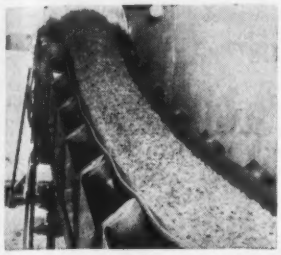


DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA., U. S. A.

Check 4076 opposite last page.



Belt going strong

. . . despite several years of service in 45° troughing idlers at Stockbridge Stone Co., Stockbridge, Ga. There has been no ply separation or other belt failure despite the acute angle and relatively heavy weight of the material being conveyed.

Secret is belt construction which is "doubly compensated" so that outer ply stretches as inner ply contracts under both lateral and longitudinal flexing, and even on reverse bends. Outer strength-member plies are special-weave high-strength synthetic fabric of carefully controlled elasticity, which relieves stress on belt as it travels over idlers and terminal pulleys.

Big advantage of being able to use 45° idler is, of course, the larger payload that can be carried—up to 60% greater, depending on material's angle of repose.

(Ray-Man conveyor belts are made by Manhattan Rubber Division, Raybestos-Manhattan, Inc., Passaic, N. J.)

Check 4077 opp. last page.

Checkweighs at speeds to 350 per minute

Detects variances of ¼% of package weight

Uses: Checkweighs sealed containers and rejects underweights and/or overweights. Handles virtually any semi-rigid container with one flat surface ranging in size from 1½ x 1½" to 10 x 10".

Features: High speeds — up to 350/min — open up possibilities of installing single unit to handle output of two or more production lines. Can detect variances of as little as ¼% of total package weight.

Description: Weighing is

THESE ALL-IMPORTANT

SERVICES

ARE YOURS WHEN YOU USE GENERAL AMERICAN'S **AIRSLIDE®** CARS

Testing Service—General American will pretest your product to determine handling characteristics. Tests conducted in General American's laboratories will assure the most efficient bulk handling of your product.

A fleet of cars is provided by General American for full scale road test operation when laboratory results indicate that your commodity's flow properties are marginal.

Supervisory Service—General American will furnish experts to supervise your initial unloading. These specially-trained men are there to insure maximum efficiency of your unloading operations.

Maintenance Service—General American maintenance assures maximum "in-service" mileage for your Airslide Cars. A nation-wide network of maintenance shops is staffed by skilled technicians to keep your cars rolling.

Airslide® & Dry-Flo® Car Division
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Offices in principal cities

AIRSLIDE GENERAL AMERICAN

Check 4078 opposite last page.

CONTAINER LINING PROTECTION

KERPON Protective Coatings

For the shipment and storage of chemicals, acids, solvents, foods and other corrosive materials in steel pails and drums.

KERPRO — **100% PHENOLIC CONTAINER LININGS**
Available in Fast Baking Clear, Aluminum, Brown and Chocolate Colors.

KERPON — **EPON MODIFIED PHENOLIC COATINGS, INTERIOR**
Available in Fast Baking Clear and Pigmented Colors.

KERPON — **AIRLESS SPRAY APPLICATIONS**

For a Low Cost Solution to Your Corrosion Problems, Write or Phone

KERR CHEMICALS, INC. | DES PLAINES, ILLINOIS P. O. BOX 189

Check 4079 opposite last page.

WARRICK Floatless Electrode Type LIQUID LEVEL CONTROLS . . .

give you all these advantages!

No moving parts in the liquid • Easy to install • No adjustments necessary • Unaffected by acids or caustics • Unaffected by pressure or temperature • Standard 2&3 pole units listed by U/L

Write for 32-page Catalog which gives complete specifications

Two pole control shown at left

YOU CAN USE OUR CONTROLS FOR:

- Single & multiple pumps
- Motor & solenoid valves
- High & low cutoffs & alarms
- Condensate contamination
- Storage tanks
- Volumetric Metering
- Waste sumps

Special controls to custom requirements

CHARLES F. WARRICK CO.
1964 W. Eleven Mile Road, Berkley, Michigan
Dep't 9 Telephone JOrdan 4-6667

Check 4080 opposite last page.

done "on the fly." Scale is preloaded by tension adjustment to set it for each package size.

Unit occupies 2 x 4' floor space, with height adjustable to fit production lines. Electronic system, housed in slide-out drawer for easy servicing, can be equipped with feedback control for filling unit, recording devices, and special construction for dusty or explosive atmospheres.

(Two-way segregation model checkweigher is product of Stokes & Smith Plant, FMC Packaging Machinery Division, 4992 Summerdale Ave., Philadelphia 24, Pa.)

Check 4081 opposite last page.

Flat-top conveyor chain of resistant 'Delrin' acetal resin

Uses: Conveying in bottling plants, canneries and other establishments packaging products in similar types of containers.

Features: Unaffected by alkalis, solvents and most dilute acids. Low initial cost and maintenance are reported. Resilient and smooth chains will not scratch cans so that rust can develop.

Chain has 1/10 the water absorption and 1/6 the stretch of previous non-metallic type, and is about 20% heavier. This means practically no discoloration or warpage and better holding to conveyor. (Water absorption is 0.12% in 24-hr immersion at 73°F; deformation is 0.5% under load of 2000 psi at 122°F; specific gravity is 1.425.)

Description: Made of Du Pont's "Delrin" acetal resin, the flat-top conveyor chains come in five widths—from 3 to 6"—each having eight links per foot and maximum working load of 500 lb. They can be operated at speeds over 200 fpm, and start and stop smoothly because of low coefficient of friction on steel (0.19 dry, 0.08 lubricated).

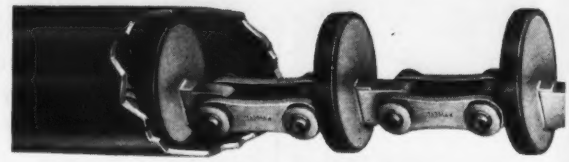
Tests show that material's resistance to bacteria and fungi, and its cleanability, are at least equal to that of stain-

Hapman Conveyors

offer you these outstanding features for your flowable material:

• Completely flexible • Compact • Self-cleaning
• Self-supporting • Self-feeding • Dust, odor-tight

almost always



cost more

. . . but return their cost many times. Sound engineering, superior materials and workmanship go into every Hapman installation. With Hapman tubular conveyors you have minimum wear, minimum degradation, and maximum trouble-free performance. This is why you may pay more initially, but with Hapman you can be sure of the best conveying system . . . and save in the long run.

For Fact-Finding Report on Hapman Conveyors, write today to:

Conveyor Division — HAPMAN CORPORATION
635 Gibson St. • Kalamazoo 6, Mich.

Check 4082 opposite last page.

VIBROLATOR®

VIBRATION INDUCERS
"WORLD'S QUIETEST VIBRATOR"

MOVE, FEED, SIFT OR COMPACT ANY MATERIAL

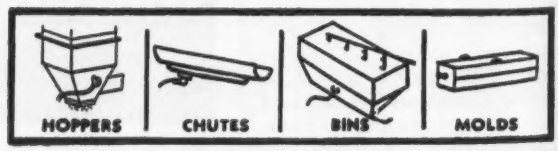
Only one moving part
Self-starting always
Needs no lubrication
Works perfectly on wet or dirty air
Sparkfree

MOVES MATERIALS OUT OF HOPPERS, DOWN CHUTES, THROUGH SCREENS. SATISFACTION GUARANTEED OR YOUR MONEY BACK.

"VIBROLATOR" vibration inducers are available in over 30 models and sizes. *Call your distributor or write for free catalog.*

"VIBROLATOR" is Martin Engineering's registered trade mark for vibration inducers and vibrator accessories.

MARTIN ENGINEERING COMPANY
Largest producer of rotary vibrators
155 Kemp Street Neponset, Illinois



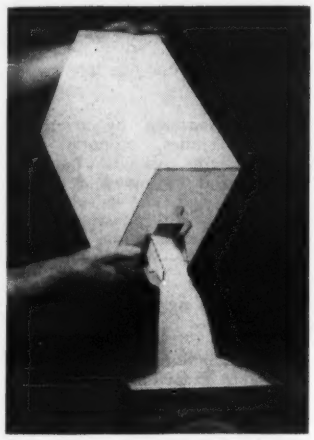
Check 4083 opposite last page.

less steel and rubber.

In one test made in a food processing plant, hot (170°F) and corrosive pickle brine ran over an unlubricated chain daily for more than 10 months. There was no warpage, practically no stretching, very little discoloration. Only maintenance required was tightening of two links. Brine contained 3½% acetic acid, 6% salt and 48% sugar.

(Nylite D conveyor chain is a product of Fenco, Inc., 125 N. Racine Ave., Chicago 7, Illinois.)

Check 4084 opposite last page.



Sift-proof corrugated box

. . . has projected use for packaging of chemicals, fertilizer, lawn or garden seed, soap flakes and institutional bulk packaging of sugar. It's filled from bottom, the side opposite the corrugated pour spout shown above locked in open position.

Box is adaptable to conventional automatic packaging equipment.

Box corners are sealed for sift-proof packaging by knife-cutting the flaps shy of score, instead of using conventional slots. Flaps are then sealed with glue. Box surface lends itself to fine color printing.

(Box is development of Fibre Drum and Corrugated Box Division, Continental Can Company, 530 Fifth Avenue, New York 36, N.Y.)

Check 4085 opposite last page.

PNEUMATIC MATERIALS CONVEYING BY ALLEN-SHERMAN-HOFF

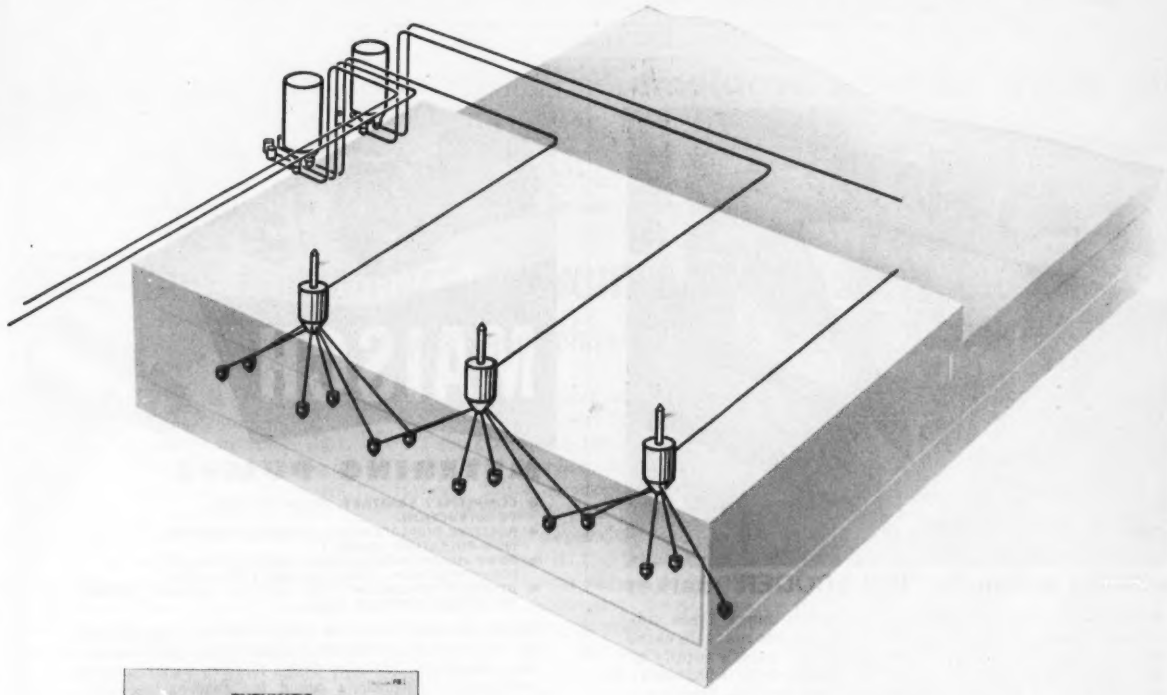
The positive pressure conveying system illustrated below is a page from our *new* Pneumatic Materials Handling Bulletin, PM-1. This is a system we engineered to deliver pellets from storage to a multitude of individual machine hoppers for continuous feeding into process.

If you are interested in investigating the advantages of conveying materials by air, we would like to send you a copy of this *new* bulletin. It pictures systems we've engineered and points the way to help in solving many of the materials handling problems of your plant and your materials.

THE ALLEN-SHERMAN-HOFF COMPANY pioneered in the field of materials handling systems—both pneumatic and hydraulic. Today we have systems in operation throughout the world, primarily in plants *where reliability of performance is of paramount importance.*

Discuss your materials handling problems with an A-S-H Representative—he's a pneumatic conveying expert. If there is any question about conveying your material, he'll arrange to have evaluation tests conducted by our Research Group. For his name and your copy of Bulletin PM-1, write, wire or phone . . .

THE ALLEN-SHERMAN-HOFF COMPANY, 257 East Lancaster Avenue, Wynnewood, Pa.

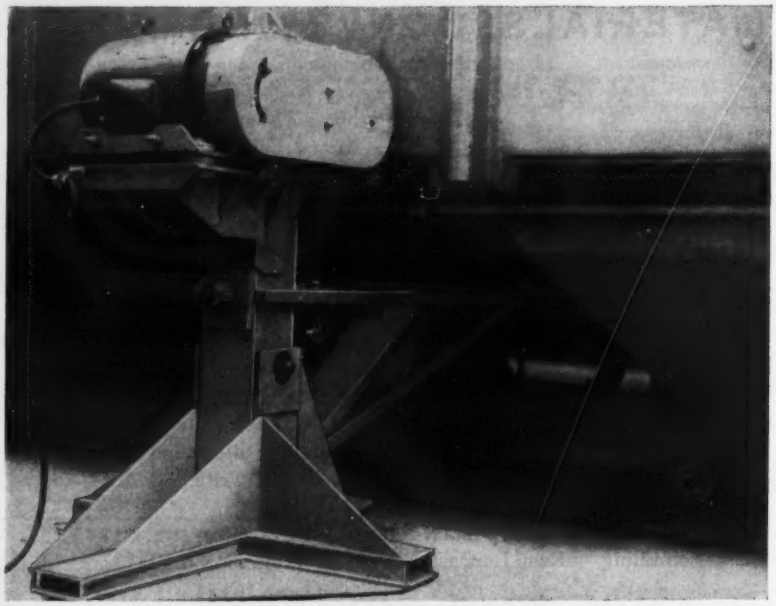


Our new Bulletin PM-1 points the way to Pneumatic Materials Handling for your plant and your materials. It's free for the asking.

Check 4086 opposite last page.

Shake Covered Hopper Cars

• for greater payload • for faster unloading



Use **NATIONAL 81** covered hopper car shaker to **compact material** during loading operations . . . up to 10% greater payload.

NATIONAL 81 provides fast, **continuous unloading** at the maximum capacity of any unloading system.

Designed for one man operation providing quick, easy, safe, trouble-free operation . . . several models available.

NATIONAL CONVEYOR & SUPPLY COMPANY
357 N. Harding Ave.,
Chicago 24, Illinois

Check 4087 opposite last page.

No more marking problems

with an automatic "ROLACODER" marker

Attaches to conveyor, case-sealer, etc. to mark from side or top • Works by friction • Imprints legible mark in same spot on case after case • Holds up to full week's supply of ink • Takes only 1 or 2 minutes to change type • No tricky adjustments • Precision-made for long trouble-free service • Pays for itself in months • Other models for marking 2 and 4 sides simultaneously

Write for "ROLACODER" literature

First and foremost in automatic production line CODING, MARKING and IMPRINTING machines

Gottscho®

GOTTSCHO Dept. W
HILLSIDE 5, N.J.

In Canada: Richardson Agencies, Ltd. • Toronto & Montreal

BOOTH 629 • PACKAGING SHOW

Check 4088 opposite last page.

Variable Speed Drive
Output adjustable from
6 to 150 ml/sec.
"MIDGET" Constant Discharge
2 to 20 cc/sec. range
Fixed Capacities
11 to 226 ml/sec;
18 to 217 gph.
MAISCH
METERING PUMPS
• COMPLETELY SANITARY, STAINLESS STEEL CONSTRUCTION.
• POSITIVE DISPLACEMENT—SMOOTH, UNIFORM, NON-PULSATING FLOW.
• PUMP HEADS DEMOUNTABLE WITHOUT TOOLS . . . FOR INSPECTION, CLEANING AND STERILIZING.
• DISPENSE BOILING-HOT OR ICE-COLD WATERY LIQUIDS OR HIGHLY VISCOUS FLUIDS.
Maisch Metering Pumps are simple in design, ruggedly built for long service, and can be depended on to maintain accuracy indefinitely. Exclusive design features insure optimum performance. Particularly suited for handling chemicals, syrups, oils, glue, processing solutions, etc. Quick demountable or fixed heads. Fixed capacity pumps available in wide range of output. Pumps in stock for immediate delivery. Write for complete details and prices.
mechanical products
MECHANICAL PRODUCTS CORPORATION
1722 WEST HUBBARD STREET, CHICAGO 22, ILLINOIS

Check 4089 opposite last page.

NEW LITERATURE

Material Handling and Packaging

Staplers operated by air power, and which have air return, high-speed piston and instant valve action, are spotlighted in four-page bulletin. Unit is high speed, has little or no recoil. Form PR1-4597—Paslode Company, Division of Signode Steel Strapping Co.

Check 4090 opposite last page.

Multi-purpose dumpers that lift standard and special containers are described in eight-page catalog. Various types of working installations are pictured throughout. Cat 59—Essex Conveyors, Inc.

Check 4091 opposite last page.

Mechanical conveyor screens for scalping and coarse and medium sizing are shown and specified in two-page catalog sheet—Syntron Company.

Check 4092 opposite last page.

Material handling by overhead traveling cranes, monorail and crane systems, vacuum handling systems, and by mover for road and rail freight car is subject of 16-page booklet. Features are highlighted, applications are pictured. Bul 246—Whiting Corporation.

Check 4093 opposite last page.

Material handling by drag-scrapers and cable excavating machines is pictured and descibed in 16-page brochure. Four sections cover excavating and hauling, storage and reclamation, engineering and construction, the marine field. "50th Anniversary Brochure"—Sauerman Bros., Inc.

Check 4094 opposite last page.

Suspension scale of high accuracy is featured in eight-page bulletin which pictures and describes applications, features, specifications. Bul 58E — W. C. Dillon & Company, Inc.

Check 4095 opposite last page.

Industrial trucks of 6000- to 10,000-lb capacity have design discussed and specifications reported in six-page folder. There are four electric vehicles in the series. R-10T Series Folder — The Elwell-Parker Electric Company.

Check 4096 opposite last page.

Formula capsule which programs weighing of up to 24 solid and/or liquid ingredients is featured in two-page Product Data Sheet 5904 — Richardson Scale Company.

Check 4097 opposite last page.

J&L lined containers were selected by Amchem Products, Inc., Ambler, Pa. (formerly American Chemical Paint Co.) on the basis of rigid tests to determine maximum protection against contamination, deterioration and shipping damage.

"J&L lined containers prevent costly nozzle clogging"

... reports manufacturer of famous WEEDONE weed killer products

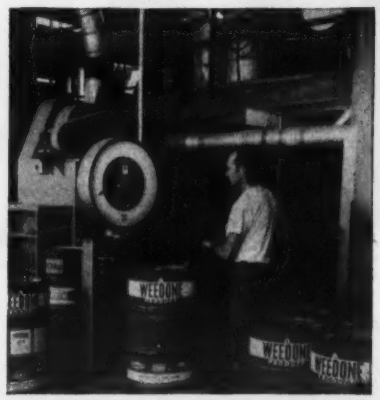
Spray-free operation is assured for Weedone products because uniform, clear phenolic linings in these J&L containers prevent nozzle clogging of weed-killer spraying equipment, state officials of Amchem Products, Inc., Ambler, Pa. If containers were not perfectly lined, insoluble metal salt particles could form from chemical reaction after lengthy storage.

Protection from contamination, deterioration and shipping damage is assured because of the high chemical resistance and stability of these J&L interior linings.

Prompt delivery and reduced shipping costs are achieved because J&L has a container plant near Amchem's Weedone production facilities.

Take a tip from the successful experience of Amchem with J&L containers. Nine strategically located J&L drum and pail plants assure you prompt, dependable delivery when you need it.

The J&L lining expert is always available to help you solve your most aggravating problems, *in confidence, of course.* For a confidential consultation with this expert, call your nearby J&L Container representative, or write direct to Jones & Laughlin Container Division, 405 Lexington Avenue, New York, N.Y.



Without baked, clear phenolic J&L linings, insoluble metal salt particles could gradually accumulate and cause trouble with clogging of spray nozzles in these WEEDONE steel containers. This filling operation is at Amchem's St. Joseph, Mo., plant.

STEEL

Jones & Laughlin Steel Corporation

CONTAINER DIVISION

3 Gateway Center, Pittsburgh 30, Pennsylvania

Check 4098 opposite last page.

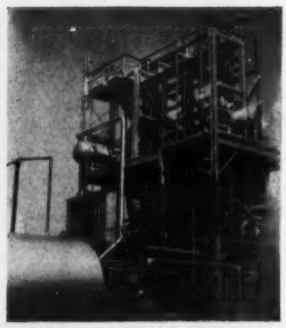
1 Dependable SOURCE FOR ALL PROCESS EQUIPMENT

Acme experience relates to all major processes . . . extends from design and engineering to fabrication in all metals. Fully qualified for complete responsibility, Acme also welcomes the opportunity to collaborate with plant engineers or engineering consultants. From design of a complete process plant to fabrication of a single unit, Acme has consistently proven an economical and efficient source.

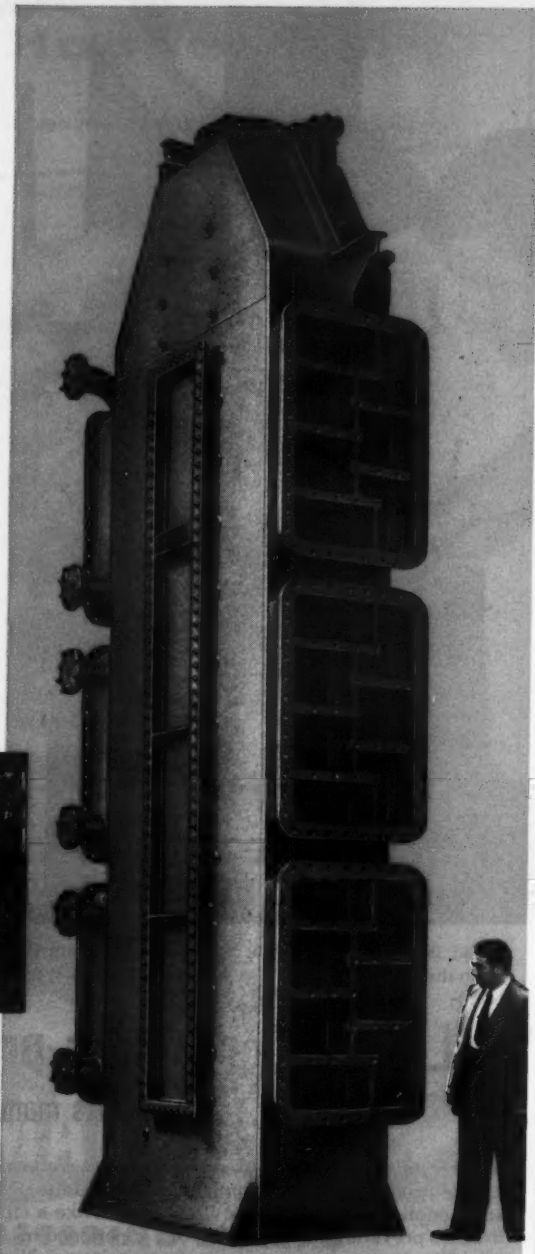
WRITE FOR CATALOG P-60
48 PAGES INCLUDING
VALUABLE HEAT EXCHANGE DATA

WEST BAY OF STEEL SHOP SHOWING 5'0" X 77'3" RIPPLE TRAY COLUMN OF STAINL. ST. IN PROCESS OF FABRICATION.

CULTURE ZULAUF TANKS, TYPE 304 STAINL. ST.-A.S.M.E. CODE AND SANITARY CONSTR.



TAR DEHYDRATION EQUIPMENT.



A.S.M.E. DRIP-TYPE CONDENSER, 2890 SQ. FT. SURFACE, MULTI-PASS STEEL CONSTRUCTION, 2'6" X 6'3" X 21' HIGH.

ACME Process Equipment Co.
ORELAND, PA.
formerly ACME COPPERSMITHING & MACHINE CO.

Check 4099 opposite last page.

HANDLING & PACKAGING

Conveying and processing equipment is given extensive coverage in three catalogs. Cat 941 in 48 pages presents entire line of equipment for weighing, batching and proportioning systems. Cat 951 (56 pages) offers much useful data on spiral conveyors. Cat 978 is 12-page brochure that presents quick panoramic view of complete line of feeders, conveyors, coolers, dryers, screens, bin-check valves, magnetic separators. The Jeffrey Manufacturing Company.

Check 4100 opposite last page.

Continuous weigher of belt (stream) type is depicted in two-page bulletin which contains a photograph of the pneumatically operated unit, lists advantages, describes operation and accessories. Bul Ref 36.20-1 — Omega Machine Co., Div. of B-I-F Industries, Inc.

Check 4101 opposite last page.

Vibration inducers in 52 sizes and types, from 4½-oz to a 3000-lb hopper-car shaker, are pictured and described in 38-page catalog. Units are available in five motive powers — pneumatic, electric, gasoline, hydraulic, steam. "Vibrolator Catalog" — Martin Engineering Company.

Check 4102 opposite last page.

Storage-rack applications are shown in over a dozen captioned photographs in four-page Bul 59-81 — Storage Products Corporation.

Check 4103 opposite last page.

Loading docks and yards — Minimum design standards and efficiency ideas that will speed in-and-out movement of trucks are included in eight-page booklet. Three pages are devoted to a discussion of the advantages of various types of loading ramps. "Loading Docks and Yards" — Kelley Co., Inc.

Check 4104 opposite last page.

Pneumatic conveyors—Drawings and explanatory text describe systems for handling bulk materials such as plastic pellets, lime and alum in six-page Bul P58G—National Conveyors Company, Inc.

Check 4105 opposite last page.

Hand chain hoist — Eight-page booklet contains tables and recommended minimum standards on differential, worm-geared and spur-geared (or equivalent) types of hand chain hoists: hook or lug suspension and plain or geared trolley. "HMA-200 Standard Specifications for Hand Chain Hoists" — Hoist Manufacturers Association, Inc.

Check 4106 opposite last page

Is filtration a problem in your plant? Are you certain that your rotary filter is operating at peak efficiency? If you're having difficulties, why not take a cue from this oil-additive manufacturer. Use of a simple lab-size test leaf . . .

• Helps find optimum filtering conditions
• Whips production bottleneck

PROBLEM: Filtering difficulties coupled with their inherent undesirable filtration results were causing major production headaches at an oil additive manufacturer's plant. Filtration cycles on large rotary unit often varied by as much as 50 percent. Uniform cake analyses were practically non-existent. Acceptable production dropped to a trickle.

In an attempt to resolve the situation, a crash research program was initiated to study major process variables affecting the operation. Factors such as type of filter aid, depth of knife cut, speed of drum rotation, etc. were investigated. Conventional laboratory and pilot plant equipment were used for this purpose. Tests were time-consuming and expensive. Unfortunately, they were also inconclusive.

Solution: Since filter aids can play an important part in any filtration, a filter aid manufacturer was called in for consultation. He suggested that additional tests be made using a laboratory-size filter test leaf developed by his company.

The device is specifically designed to study variables which affect operation of rotary vacuum precoat filters. The following factors can be accurately determined:

1) Size of filter for new installation
2) Type, grade, and quality of filter aid
3) Quantity of filter aid needed for precoat
4) Effect of body feed
5) Knife cut
6) Flow rate
7) Clarity of filtrate
8) Effect of rotational speed
9) Effect of submergence
10) Effect of vacuum
11) Effect of temperature
12) Operating costs

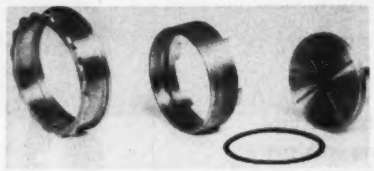
A complete study of major process variables can be made in a few hours using a relatively small volume of slurry (only about 600 to 800 ml are required per test). Operation is relatively simple. A qualified lab technician can learn to expertly use the device in approximately ½ day.

Test leaf consists essentially of three parts: 1) a one-tenth sq ft septum support fitted with vacuum gage; 2) retaining ring, internally threaded to permit screwing onto the support; and 3) an outer ring threaded to allow screwing it onto retaining ring.

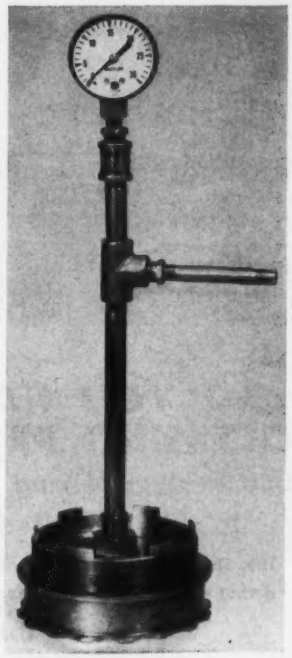
Retaining ring has narrow shoulder which holds filter cloth (or screen) against supporting surface by means of gasket. To adjust cake thicknesses, outer ring is graduated in 0.005″ increments. Full turn represents 0.050″.

In use, plant conditions are duplicated as much as possible. Vacuum at about 25″ Hg is used. Leaf is precoated with lowest practical filter aid slurry concentration. After draining, vacuum is disconnected, and cake is cut with a knife. Progressively smaller cuts are made until surface of cake is even with that of retaining ring. Several additional cuts of 0.010 to 0.020″ are made until precoat is perfectly smooth.

After precoat is formed, main process liquor is substituted for precoat slurry. With vacuum applied, leaf is immersed, removed, and cake permitted to drain. Cycle corresponds to that used in plant or judged to be appropriate for a new application. Knife cut is made at atmospheric pressure — again to simulate

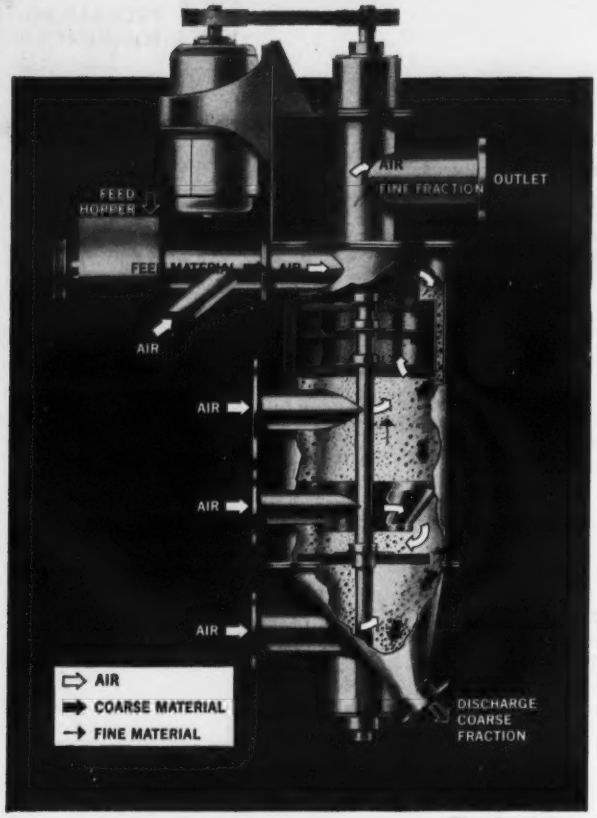


Filter test leaf consists of three simple components: outer ring (far left), retaining ring, and septum support



Test leaf assembled

Lab-size filter test leaf provided data to get optimum performance from large rotary filter



Get the fraction you want more efficiently with the new MAJAC AIR CLASSIFIER!

MAJAC AIR CLASSIFIER allows finer cut points . . . with considerably sharper classification than any other method.

OPERATES more efficiently than any other classifier . . . providing a higher yield of desirable end product.

MORE PRECISE particle size control is possible with the Majac Air Classifier than with any other classifier . . . and with a wide range of cut points.

PERMITS HANDLING and classification of material in dry state.

HUMIDITY CONTROL, drying, blending, coating and controlled chemical reactions can be carried on simultaneously with classification.

Sizes for lab, pilot plant or production use in a wide range of capacities.

Write today for detailed information or visit by qualified Majac representative.

MAJAC, INC.
Twenty-third St., Sharpsburg, Pittsburgh 15, Pa.

Designers and manufacturers of pulverizing, classifying and separating equipment for industry.

Check 4107 opposite last page.

DO YOU HAVE A PROCESSING PROBLEM . . .

that involves Mixing, Blending or Particle Size Reduction?

The Strong-Scott Mfg. Co. specializes in producing equipment to solve processing problems

PRECISION UNITS

- For intimate mixing of solids and semi-solids on a continuous basis
- For accurate blending of small amounts of critical ingredients into large batches of basic material
- For pulverizing hard or soft materials to the extreme fine range (95 to 99% less than 5 to 10 microns) or in the coarse range (60 mesh and thereabouts).

PLUS *Customized Processing Systems*
Consult Strong-Scott for Complete Information

The Strong Scott Mfg. Co.

451 Taft Street N.E., Minneapolis 13, Minn., Dept CP

Firm _____
Address _____
City _____ State _____
WE (MIX) (BLEND) (PULVERIZE) _____
_____
Signed _____

Check 4108 opposite last page.

SAVE ON FILTER MEDIA OF ALL TYPES

...with LAMPORTS JOB ENGINEERING

With hundreds of different fibers, constructions and grades of filter media available, it takes a specialist to guide you to the most efficient and economical material for any given job. Lamports engineers are qualified by years of experience in the field to advise you on any filtration problem. Double-check your present media with us, or let us help you plan your next installation. Technical assistance without obligation. Call, write, wire, or TWX.

THE HEART *filter media are the of the filtration system!*

See our advertisement in Chem. Eng. Cat.

Lamports COMPANY

1405 W. Sixth Street • Cleveland 13, Ohio
Phone: MA 1-3315 Teletype CV-768

Check 4109 opposite last page.

conditions on plant filter.

Actual filtration tests usually require five to ten cycles, depending on filtration characteristics of liquor. At end of series, filtrate volume is measured and recorded. Successive cake cuts are made and examined for clean surfaces. At least two series of tests are conducted to insure accurate results. Excellent correlations between filtration rate, filter aids, and other factors can thus be determined.

Results: Use of the filter test leaf helped provide engineers with proper data to solve the filtration problem. Necessary corrective actions were taken and the production bottleneck was promptly eliminated.

Because of the excellent results obtained with the test leaf, laboratory personnel realized that the device could also be beneficial to them in other applications. However, the filter aid producer does not manufacture the units. He can have them made on request or will furnish drawings. From these the plant built one of their own. Total cost was about $200.

Test leaf has met all expectations and has been found to be a valuable tool, both in the lab and plant. Device is used quickly as soon as any inkling of filtration troubles appear. It is also used to run routine checks.

(Further information about Dicalite rotary precoat filter test leaf and filter aids may be obtained from Dicalite Department, Products Division, Great Lakes Carbon Corporation, 612 S. Flower Street, Los Angeles 15, California.)

Check 4110 opposite last page.

Pressurized centrifuge geared for operation at 1000X gravity

Withstands internal pressures of up to 150 psi

Uses: Separating liquids from solids.

Features: Pressurized centrifuge operates at 150 psi and is engineered for normal operation at 1000X gravity. Pro-

duction capacity, processing ammonium sulfate, is 26 tons per hour.

Description: Pressurized centrifuge has 40" diameter basket. Capacity is eight cu ft. Speed is 1325 rpm, which corresponds to peripheral speed of approximately 13,900 fpm. Machine uses 75 hp motor, having speed of 1800 rpm. Total weight of centrifuge is about 12,500 lb.

Unit's front door has efficient clamping and self-aligning seal. Housings are built to withstand high pressures. Sealing arrangement is designed for both self-aligning and self-seating for ease of operation. Door can be firmly locked in place in matter of seconds. A safe lock is assured without necessity of tightening bolts. Conventional hinge is used instead of an articulated type.

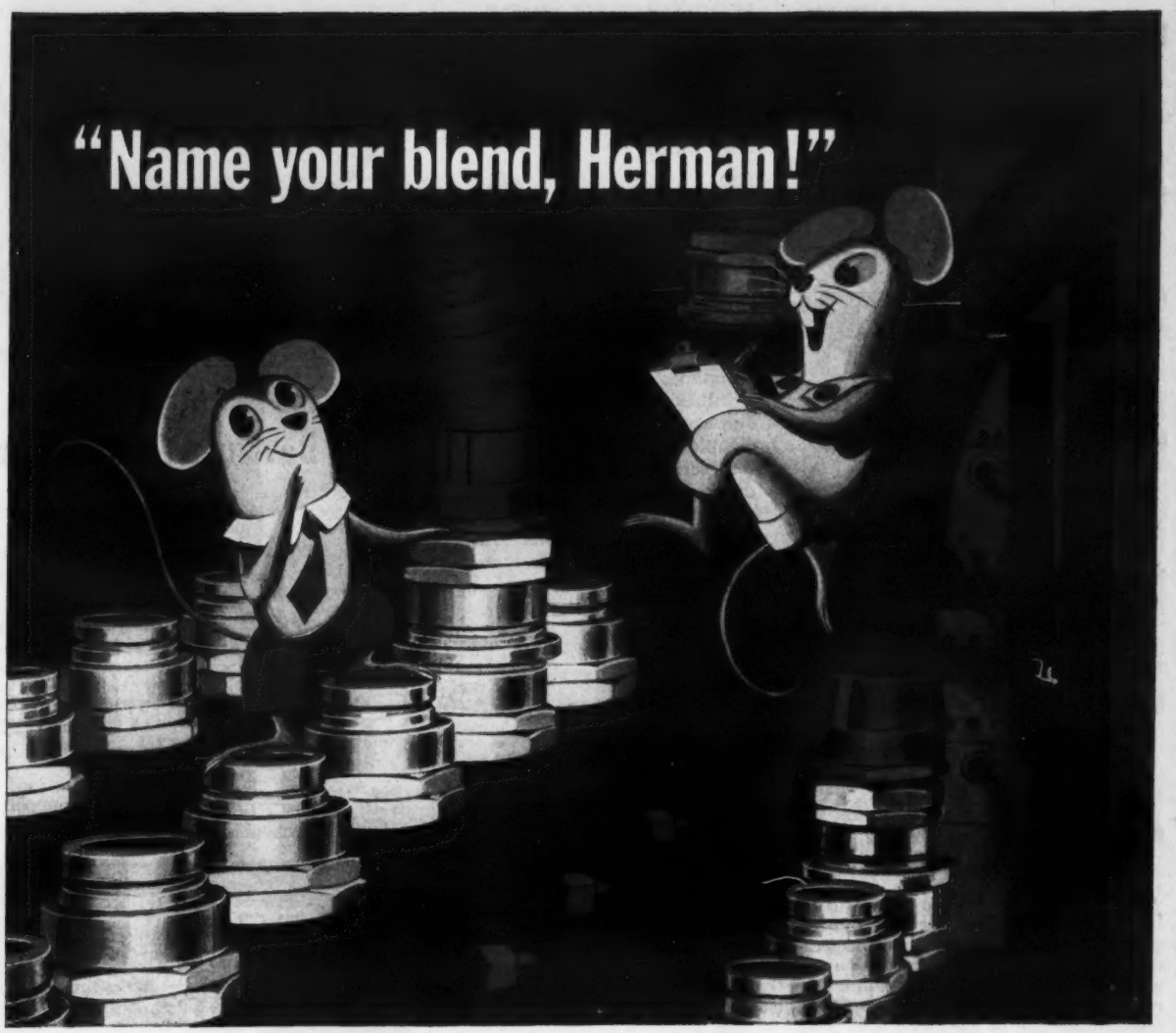
Front door on centrifuge is equipped with efficient clamping and self-aligning seal, assuring safe lock without necessity of tightening bolts

Discharge knife and chute are also of simple design. Provision has been made so that peeler knife enters cake at successively increasing depths. Glazing of the heel, common problem in the past, is said to be eliminated.

Knife box and chute are designed so that complete discharge of all solids will be effected. There is no swirling or dusting of solids within the housing. Air displacement is controlled during both charging and peeling operations.

(HS 40 W Universal pressure centrifugal is product of Baker Perkins Inc., Chemical Machinery Div. Saginaw, Mich.)

Check 4111 opposite last page.



Here's the new, easy way to blend fluids: with Snap-Tite valved couplings on flexible lines

Now there's no need to laboriously open and close a lot of shut-off valves when you're blending petroleum products or other chemical fluids. With Snap-Tite valved couplings on flexible lines you can quickly switch hoses to any base stock line as required. Mixing is faster: you can perform more operations at one time . . . with no danger of contamination of base stocks by interflow through leaky valves! Valves with Snap-Tite couplings instantly shut off the flow when disconnected, and prevent run-out from overhead lines.

Under this arrangement, you store only base stocks to achieve infinite variations in blending. Not only do you save space, time and labor, but by eliminating shut-off valves and associated headers and permanent piping, you save substantially on equipment. In a recent installation (Standard Oil at Richmond, Cal.) the coupling cost was approximately one-third that of permanent piping!

For information, write for Snap-Tite Catalog No. 59. Ask for the name of your local Snap-Tite representative. There is no obligation.

TO USE SNAP-TITE VALVED COUPLING:

CONNECT—Full flow instantly

DISCONNECT—Stop flow instantly

★Snap-Tite

ST-59-05

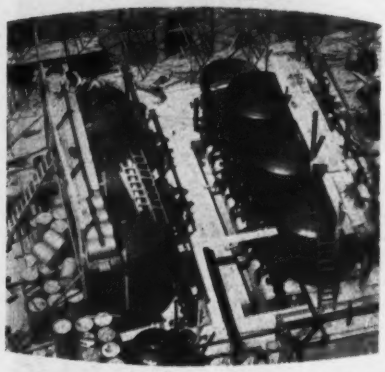
UNION CITY, PA.

Check 4112 opposite last page.

PATHWAYS OF A PIONEER

ILLCO-WAY DESIGNERS AND BUILDERS

MODERN EQUIPMENT FOR ionXchange



This picture was taken in *1943* of a Continuous *600 gpm* IonXchanger during installation at a midwestern chemical plant. The tanks are shown being loaded with ionXchange resins.

Blazing the Trail for De-I Developments

When the photograph above was made, IWT already had well over 50 large industrial ionXchangers in successful operation — yet ion-exchange in those days was still considered a "new and untried" process! Many of these pioneering IWT installations are *in use today*, and most of the early users of IWT ionXchange have *added to* and *modernized* their equipment as new developments became available.

Even today IWT is still pioneering — adding to its great stock of knowledge in this specialized field, designing and building up-to-date ionXchangers of all types and sizes for application to a wide variety of processes as well as all kinds of water-treatment, experimenting with and carefully testing new ionXchange uses, and constantly improving existing designs.

THIS EXPERIENCE CAN MEAN A LOT TO YOU

If you need pure water for high-pressure boiler make-up or process use, or if you are considering the use of ion-exchange for purification or concentration of chemical products, be sure to take advantage of IWT pioneering experience and specialized knowledge. *Call your IWT representative.*

ILLINOIS WATER TREATMENT CO.
840 CEDAR ST., ROCKFORD, ILLINOIS
NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Ont.

Check 4113 opposite last page.

PROCESSING EQUIPMENT

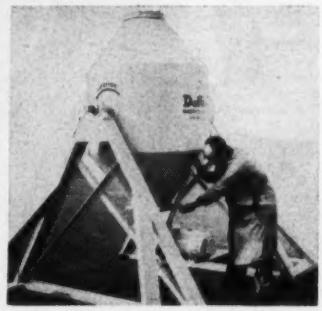
Precise blending in one minute with mixer

Unit can process wide variety of dry materials

Uses: Blending dry, free-flowing materials in chemical and allied industries.

Features: Mixer's design provides for fast, efficient blending. At the end of five revolutions or approximately one minute, unit produces complete mix.

Description: Machines are of batch type, available in capacities ranging from a few pounds to over 16 tons. Units can be built of stainless steel or other alloys. Products to be mixed are charged into lower compartment of unit. Action produced by series of interior channel separators coupled with low-speed rotation of drum blends ingredients twice each revolution.



Five revolutions of mixer's drum achieve complete blending of dry, free-flowing materials

(Further information about batch mixers may be obtained from Daffin Manufacturing Company, Lancaster, Pa.)

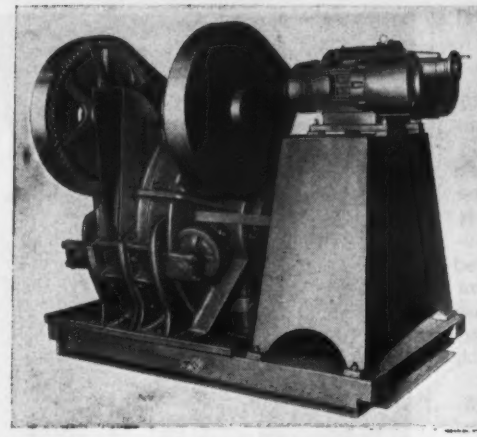
Check 4114 opposite last page.

Prevent hot spots, assure uniform heat with infrared oven

Uses ceramic face as source of radiation

Uses: Drying various solids in chemical and allied industries.

Features: Modular infrared oven prevents hot spots, provides uniform heat over entire



DAVENPORT
PRESSING — DRYING and COOLING Equipment
Continuous DeWatering Presses
ROTARY DRYERS Steam Tube, Hot Air and Direct Fire
Atmospheric DRUM DRYERS
ROTARY COOLERS Water and Air

1A Davenport Continuous Dewatering Press

This unit is being supplied for dewatering a mixture of coarse and fine fiber from the manufacture of starch. If you have a similar dewatering problem perhaps a Davenport will do the job for you.

Let our engineers consult with you on your Pressing, Drying and Cooling problems or send for our catalog C. For quick reference consult your Chemical Engineering Catalog.

DAVENPORT MACHINE AND Foundry Company
DAVENPORT IOWA, U. S. A.

Check 4115 opposite last page.

Your product has to be best .... and so do your screens. Your present equipment can be equipped with Bee-Zee Screens, round-rod as shown above or in any of the special rod shapes shown below. Screens are all-stainless-steel and *all-welded*, with electronic control spacing the rods precisely. Find out how Bee-Zee Screens turn problems into profit — to make you money. Wire, write or phone Galesburg DIckens 2-5154 collect.

BIXBY-ZIMMER ENGINEERING CO.
720 Abingdon St., Galesburg, Ill.

Bee-Zee Screens in a wide variety of shapes and sizes meet the needs of leading firms in the coal, minerals, quarry, oil, food, chemical, plastic, brewing, distilling, pulp and paper, rubber and other industries.

Check 4116 opposite last page.

emitting area. Unit can be used with conventional conveyor systems.

Description: Oven has self-contained heater which utilizes a ceramic face as source of infrared radiation. Element is brought up to emission temperature by formed resistance wire embedded in an insulating block. The heating block is backed up by alternate layers of batt and reflective insulation. All are mounted in a sheet metal shell of modular dimensions.

The entire ceramic face emits heat. There are no bulbs, tubes, or reflectors. The protected heating element has long life and requires no maintenance.

Oven is designed to permit radiant energy which does not strike object being processed, to be absorbed by module on opposite side. This regenerative feature cuts power requirements and boosts oven's efficiency.

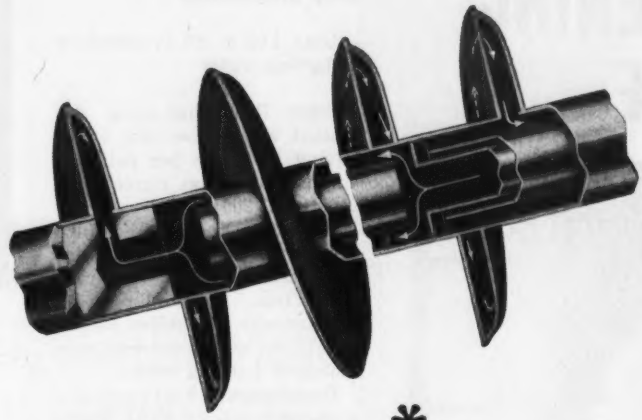
A typical 6-ft oven provides up to 500 watts per sq ft radiation. Product temperatures go up to 400°F. Other units are available having up to 2000 watts per ft. Individual sections may be added as needed.

(Modular infrared ovens are product of Infra Red Systems, Inc., 240 Route 23, Riverdale, New Jersey.)

Check 4117 opposite last page.

"Dear! You sold that million dollar chemicals contract!"

New savings in heat-exchange processes . . .



THE holo-flite* PROCESSOR
(HOLLOW-FLITE)

A simpler, more compact way to cool, heat or dry—in continuous flow!

Do you have processes where slurries, solids, pulps or pastes must be cooled, heated or dried? Do you know you can now handle such processes—*in continuous flow*—in as little as 1/5th the space required by other types of heat exchangers—and with many other important advantages?

The revolutionary HOLO-FLITE Processor is the answer!

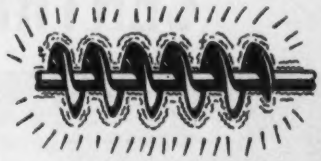
what IT IS!

Basically the HOLO-FLITE consists of two or more flights of hollow-bladed screw conveyors. The product to be processed moves in a trough around the conveyor screws. The heat-transfer fluid circulates through the hollow blades and shafts of the conveyor. The product is constantly rotated into, around, under and over the blades and shafts through which the heat-transfer fluid is circulating, assuring quick, uniform heat passage between the two mediums—*as the product is continuously moved along in a bulk-flow without interruptions!*

Our engineers will gladly study *your particular* operations and make recommendations. Write, wire or phone our nearest office!

why IT'S BETTER!

The HOLO-FLITE principle provides many important advantages in modern processing operations . . .



ITS LARGE HEAT-TRANSFER SURFACE requires far less space—as little as 1/5th the space required by other heat-exchange equipment. Further, flights can be "stacked" as high as desired to save floor space, simplify installation!

ITS SLOW ROTATION IS SO GENTLE that granular and powdered solids are handled with no dusting—little or no particle abrasion. Result—no dust recovery problems . . . simple, inexpensive installation.

IT IS ADAPTABLE to a wide range of applications—handles solids, pulps, pastes and slurries with equal ease. Heat transfer agent can be refrigerant, water or other fluids to provide a wide range of temperatures. Cooled products can be packed directly from HOLO-FLITE discharge, saving time, space and additional handling.

IT CAN BE DESIGNED to handle virtually any capacity by varying the diameter and length of the flights, and the number of "tiers."

FREE 8 PAGE bulletin describes Holo-Flite features and applications. Send for your copy!

COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
THERM-O-FLEX Hi-Temp Filters
TURBULAIRE-DOYLE Scrubbers
HOLO-FLITE Processors
HI-TURBIANT Heaters

WESTERN
PRECIPITATION
DIVISION OF JOY MANUFACTURING COMPANY

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

LOS ANGELES 54 • NEW YORK 17 • CHICAGO 2 • PITTSBURGH 22 • ATLANTA 5 • SAN FRANCISCO 4

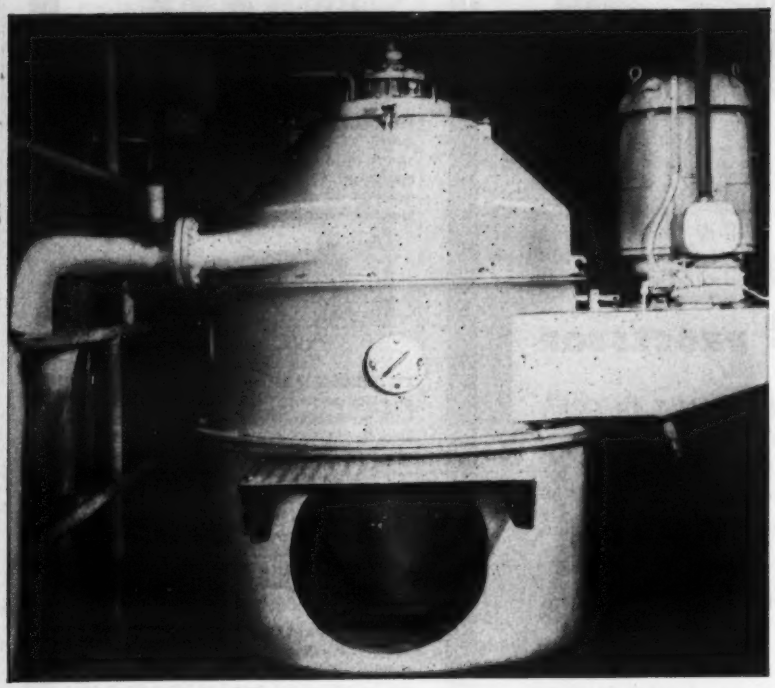
Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9

Check 4118 opposite last page.

Western Condensing Company gets Dry, Clean Lactose Crystals at Lower Processing Cost with the

MERCONE SCREENING CENTRIFUGE



A Mercone screening centrifuge is giving Western Condensing Company of Appleton, Wisc., more efficient separation of lactose crystals from cheese whey. Here's why:

Improved Product—Lactose crystals discharged from the Mercone are exceptionally clean and dry. The high quality of the separated product reduces the amount of refining chemicals required.

Maximum Recovery of Crystals—A DorrClone liquid cyclone used with the Mercone unit separates out fine crystals, recycles them through the Mercone. This Mercone-DorrClone combination gives maximum recovery of lactose.

Lower Operating and Maintenance Costs—The Mercone screening centrifuge occupies half the floor area of previous separation machinery, and has considerably greater capacity. Western Condensing's maintenance costs for the Mercone are less than those for the previous installation.

A compact, completely enclosed sanitary unit, the Mercone screening centrifuge is particularly well adapted to food processing. For information, just drop a line to Dorr-Oliver Incorporated, Stamford, Connecticut.

Mercone and DorrClone are Trademarks of Dorr-Oliver Inc., Reg. U.S. Pat. Off.

DORR-OLIVER

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

Check 4119 opposite last page.

PROCESSING EQUIPMENT

Packaged demineralizer designed for quick, easy installation

Uses 110 v, 60 cy standard lighting outlet

Uses: Producing pure, deionized water from raw water having 10 grains per gal total anions. Capacities range from 2100 to 13,200 gph.

Features: Packaged demineralizer is designed for quick installation. Only electrical connection required is for conductivity controller, which uses 110v, 60 cy current from standard lighting outlet.

Description: Valves and pipe are made of PVC. Tanks are also lined with the material. Auxiliary polyethylene regenerant tanks are provided for acid and alkali.

Demineralizers are equipped with conductivity and flow rate indicators. Optional controls include water meter, audible alarm, and automatic cut-off valve to stop flow at end of cycle. Units are available in four different sizes. Floor space requirements range from 3'6" x 2'8" x 9' high to 4'9" x 4' x 9'3" high.

(Model M packaged demineralizers are product of Cochrane Corporation, 17th Street Below Allegheny Avenue, Philadelphia 32, Pa.)
Check 4120 opposite last page.

Fertilizer mixer feeds directly to granulator-cooler

By-passes need for spout and elevator at discharge

Uses: Mixing synthetic fertilizers.

Features: Mixer is designed to permit immediate expulsion of steamy corrosive vapors, by-passing need for spout and elevator at discharge point. Remotely controlled and air—cylinder-actuated, mixer can feed directly into a granulator-cooler, thereby reducing initial capital investment and maintenance costs.

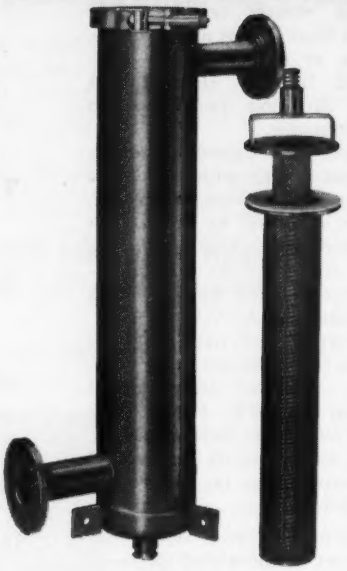
Description: Extra-heavy gage steel construction of mixer replaces need for stain-

STRAINERS

DESIGNED & BUILT TO YOUR SPECIFIC REQUIREMENTS

"INDIVIDUALIZED"

to serve you better



STRAINER ELEMENTS—Design based on precise study of flow rate and pressure drop, selection of proper metallic fabric from our broad stock range, and research on proper sizing and supports.

HOUSINGS—Designed for dirt load, accessibility of strainer elements for cleaning, piping, corrosion resistance, etc.

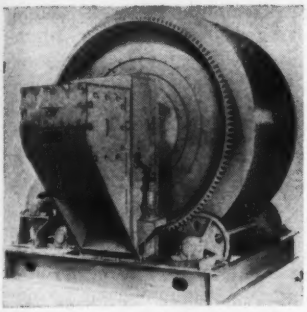
Coordination of all these considerations is essential to superior strainer performance — and Multi-Metal assures it. Write for Catalog.

MULTI-METAL WIRE CLOTH CO., INC.
1356 GARRISON AVENUE
NEW YORK 59, N. Y.

Check 4121 opposite last page.

less steel at all contact points. Revolving scoopes of mixer are fabricated of Cor-Ten high-alloy steel.

Open-door design permits quick accessibility to all moving parts. Acid gas vent located above extended stainless steel introduction-discharge



Fertilizer mixer is designed to achieve immediate expulsion of steamy corrosive vapors

hatch area, permits immediate expulsion of fumes during mixing process. Venting also achieves preliminary partial drying and cooling action.

Mixers are available in capacities ranging from four to 65 tons per hour.

(Fertilizer mixer is product of Sturtevant Mill Company, Dorchester, Boston, Mass.)

Check 4122 opposite last page.

Future looks bright for paper machine

New paper making machine is causing quite a ruckus in the paper and board field. Reported to be the first major change in paper making principles in 150 years, the machine is being used to produce many sheets previously made on conventional machines.

Known as the Rotoformer, the unit is a product of over five years of research and development. One of the machine's big advantages is that it gives the paper manufacturer more complete control over the paper making process.

Adjustments permit control of sheet formation as well as machine direction. Regulator adjusts both vertically and horizontally to accurately

"NATIONAL" PERFORATED APRON CONVEYOR DRYER

Evidence of the outstanding efficiency and economy of this "National" drying unit is found in the number of existing and on-order installations among the Nation's leading chemical manufacturers.

Increased drying capacity per square foot of surface; improved uniformity of dried product; much easier apron cleaning; greater efficiency and accessibility of gas or steam heaters; and a generally neater machine to operate and maintain, are characteristics of this drying system resulting from unique and exclusive features of "National" design, construction, operation and control.

The same type of dryer is used by the Nation's leading manufacturers of synthetic fibres.

The following well-known companies are among the current users of "National" Perforated Apron Conveyor Dryers:

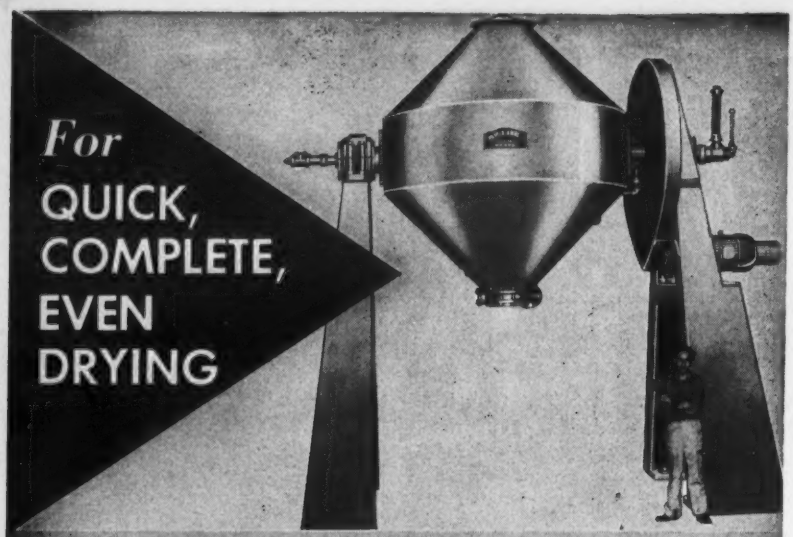
AMERICAN VISCOSE CORPORATION
ARMOUR & COMPANY
THE PHILIP CAREY MANUFACTURING CO.
DAVISON CHEMICAL COMPANY, DIV. OF W. R. GRACE & CO.
DU PONT COMPANY OF CANADA (1956) LTD.
E. I. du PONT de NEMOURS & CO.
THE GENERAL TIRE & RUBBER CO.
CONGOLEUM-NAIRN, INC.
O. M. SCOTT & SONS CO.
A. E. STALEY MANUFACTURING CO.
AMERICAN ENKA CORP.
NATIONAL ANILINE DIVISION, ALLIED CHEMICAL & DYE CORP.
NATIONAL METAL EDGE BOX CO.
CANADIAN INDUSTRIES, LTD.
RADIO CORPORATION OF AMERICA
THE DOW CHEMICAL CORP.
CHEMSTRAND CORP.
UNION CARBIDE & CARBON CORP.

Write for Literature Describing These "National" Dryers and Typical Installations.

THE NATIONAL DRYING MACHINERY COMPANY
LEHIGH AVE. and HANCOCK ST., PHILADELPHIA 33, PA.

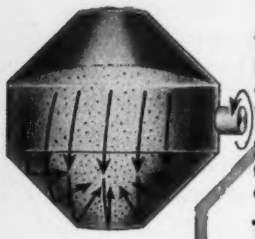
New England Agent: JONES & HUNT, INC., Gloucester, Mass. Cable Address: "NADRYMA"—W.U. Code

Check 4123 opposite last page.



For QUICK, COMPLETE, EVEN DRYING

use the Paul O. Abbé ROTA-CONE VACUUM DRYER



The gentle agitation of the Paul O. Abbé Rota-Cone Vacuum Dryer gives the material quick, even, complete drying of the entire batch. No wet and dry spots can occur as with some other types of dryers.

So gently is the material agitated, that there is no contamination or degradation of even the most delicate materials. Yet the entire load is kept constantly in motion so it dries uniformly.

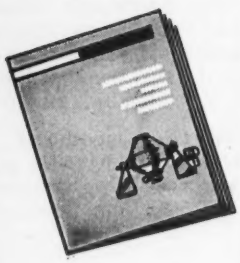
The Paul O. Abbé Rota-Cone Vacuum Dryer can also be used as a Cone Blender. You get the use of two machines for the price of one! The Paul O. Abbé Rota-Cone action produces a perfect blend.

The machine is easy to clean, since there are no agitators or baffles. There is no dust, since an internal filter is used.

The Paul O. Abbé Rota-Cone is safe. No poisonous or otherwise hazardous fumes can escape.

If you are not now using this Rota-Cone, your drying operations suffer.

Write us now for folder illustrating and describing in detail, the Paul O. Abbé Rota-Cone Vacuum Dryer. Just use the coupon below. No obligation.



Paul O. Abbé Inc.
402 Center Avenue, Little Falls, N. J.

Please send me illustrated folder describing in detail the Paul O. Abbé Rota-Cone Vacuum Dryer.

Name.....
Company.....
Street.....
City.....State.....

PAUL O. ABBE

402 CENTER AVENUE, LITTLE FALLS, NEW JERSEY

Check 4124 opposite last page.

control sheet velocity through forming area.

Web-forming tests are also being conducted on nylon, Dacron, and acrylic fibers. The machine can handle relatively large quantities of water needed to keep these fibers properly dispersed. Unit then dries the web so that it can be carried to presses and final dryers.

(Rotoformer is development of Sandy Hill Iron and Brass Works, Hudson Falls, New York.)

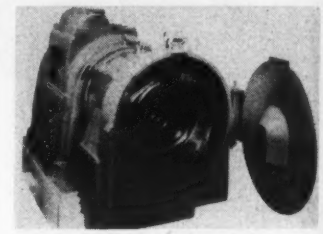
Slow draining materials handled efficiently with 'push-type' centrifugal

Machine makes use of multiple number of baskets

Uses: Liquid-solids separation of slow draining slurries having particles in 50 to 100 micron range. Various materials ranging from minerals to pharmaceuticals can be handled on a continuous basis.

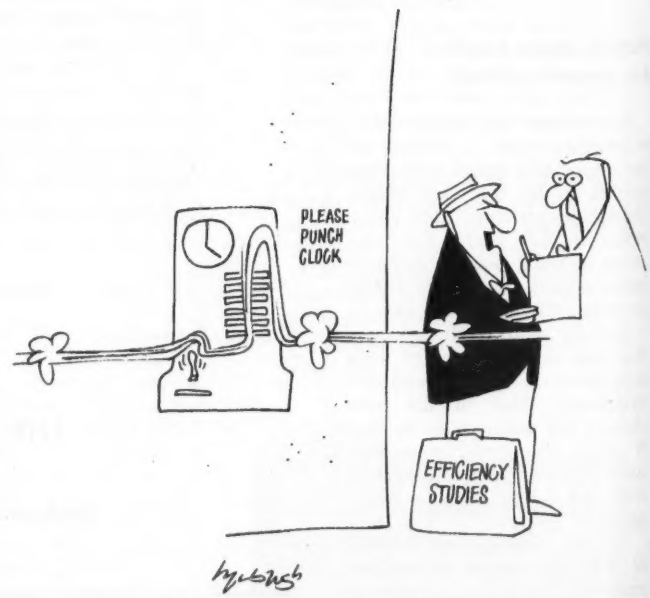
Features: "Push-type" centrifuge makes use of a multiple number of baskets, telescoped one into the other. Pusher action prevents buckling of cake and assures adequate retention time for thorough drying.

Description: A development of Escher-Wyss of Switzerland, multi-stage centrifugals are available in sizes ranging in capacity from a few hundred to 100,000 lb per hr.



Swiss-developed centrifugal is now available in U.S.

Baskets are connected to hub and pusher mechanism in such a manner that basket section, which is stationary in the axial sense, is followed by a basket receiving lateral motion from the pusher. Consequently, end of each basket serves as pusher for the following stage.



"I found the workers peak efficiency about quitting time . . ."

Shorter baskets and rearrangement of cake between stages assures thorough washing, with minimum wash liquor. Good separation of various liquid components is also reported.

Wash may be applied to any of the different baskets. It is also possible to separate wash liquor from mother liquor by slight modification of liquor housing.

Power requirements of the centrifugal is reported to be less than that of single-stage machines. Explanation is that push pressure is used both on forward and return strokes which results in a constant power demand. Also, since large part of liquor is removed from smaller diameter stages, acceleration power consumption is minimized.

(Further information about multi-stage centrifugals may be obtained from Chemical Machinery Division, Baker Perkins Inc., Saginaw, Michigan.)

Check 4125 opposite last page.

Up to one ton per hour handled by efficient vibrating ball mill

Occupies only ½ floor space of conventional units

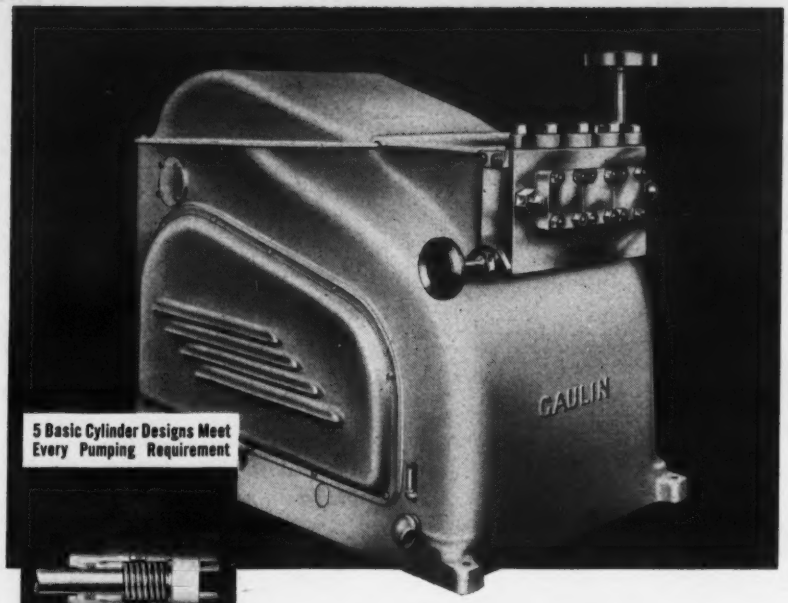
Uses: Grinding dry products to fine sizes at rates up to one ton per hour.

Features: Floor space requirements for machine are said to be less than half the amount needed for conventional equipment of similar capacity.

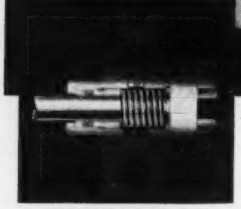
Description: Mill is part of compact plant which includes all auxiliary equipment including vibrating feeder, elevator, gyratory screen, weighing device, and dust collector.

In operation, vibrating balls impart continual, vigorous action to grinding charge. Holding bins and variable speed elevator and feeder make it possible to process dry materials ranging from 30 to 300 lb per cu ft density. Dust collection is provided at all necessary points.

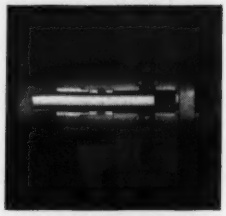
Examples of materials that



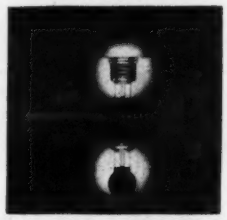
5 Basic Cylinder Designs Meet Every Pumping Requirement



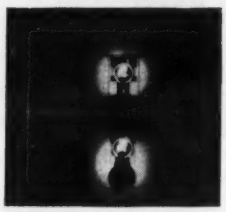
Spring loaded packing



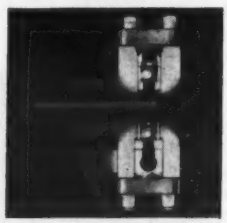
Packing adjusting screw style stuffing box



Poppet Valve, stainless steel



Ball valve, hardened inserted valve seat



Ball valve, removable seats

Gaulin Triplex Pumps Increase Your Pumping Capacity, Extend Your Pumping Pressures . . .

Reduce Operating and Maintenance Costs, Too!

Gaulin Horizontal Triplex Pumps handle large volume of all types and densities of fluids. Rugged, compact and dependable, they provide long service life at minimum maintenance costs in transfer, metering and spray drying applications.

Horizontal Design provides well area separating product from crank case.

Well Area can be gasketed for maintaining sterility . . . or for inert compatible chemicals (gases or liquid) for hazardous materials.

Gaulin Cylinder can be disassembled in minutes.

Capacities from 50 to 6500 GPH . . . pressures from 500 to 12,000 psi.

Write for Bulletin P-55. At the same time ask for GTA . . . *Gaulin Technical Assistance* . . . for experienced advice and factual data on the best method to move or blend your product.

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55 Garden Street, Everett 49, Mass.

World's largest manufacturer of stainless steel reciprocating, rotary, pressure exchange pumps, dispersers, homogenizers and colloid mills.

Ask GTA...

Gaulin Technical Assistance — for data on the complete Gaulin line: Homogenizers, Colloid Mills, Submicron Disperser, Triplex High Pressure Pumps and HX Pumps. Get GTA from your nearest Manton-Gaulin Representative . . .

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998 Farmington Avenue

Check 4126 opposite last page.

have been successfully ground with equipment include alumina, blast furnace slag, perlite ore, silica sand, and tungsten carbide.

(Further information about vibrating ball mill may be obtained from Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin.)

Check 4128 opposite last page.

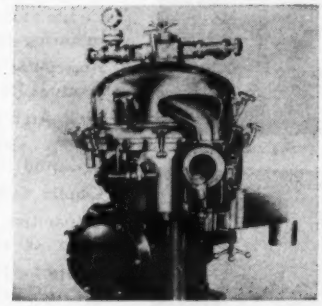
No manual bowl cleaning needed with self-opening centrifugal separator

Solids are ejected while unit operates at full speed

Uses: Continuous processing of liquid mixtures having high solids content. Specific gravity of feed material should not exceed 1.5.

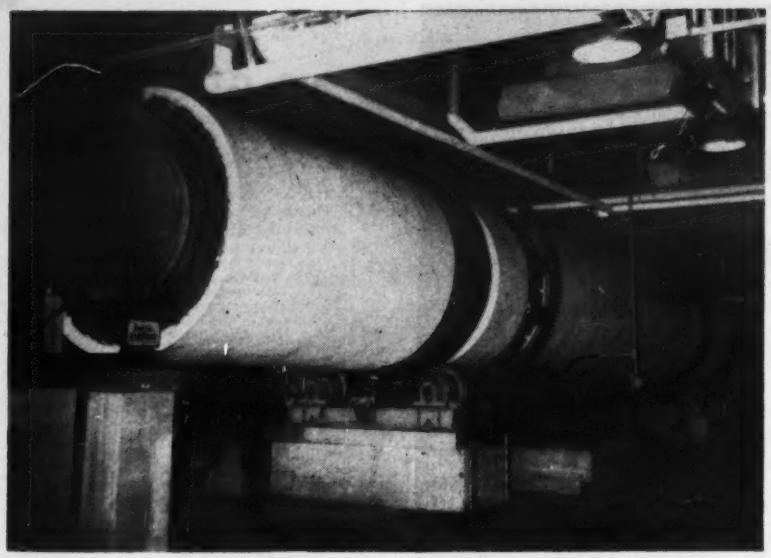
Features: Design permits automatic ejection of solids while bowl is operating at full speed. Discharge cycle takes only a few seconds and bypasses need for manual bowl cleaning.

Description: Machines are designed primarily for operations where the amount of solids present would quickly fill up the bowl of conventional centrifuges. Units may also be used where there is insufficient feed to use nozzle bowl separators, or where high concentration of solids discharge is required.



Centrifuge is designed to handle high solids content slurries

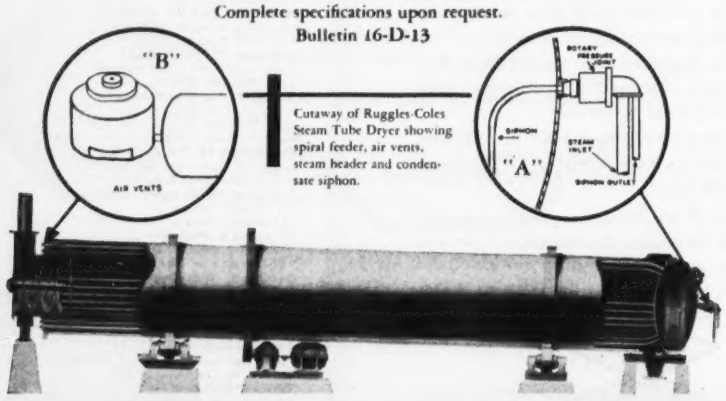
In operation, solids build up along the bowl wall, similar to conventional unit. However, when separated solids reach predetermined amount, series of apertures on bowl wall are exposed and solids



Ruggles-Coles STEAM TUBE DRYERS

- Ruggles-Coles Steam Tube Dryers have been supplied fabricated of aluminum, nickel, monel, inconel, stainless steels and other alloys to provide protection against corrosion and contamination. All fabrication is to code requirements.
- The continuous siphon discharge of condensate is independent of speed of rotation of the shell. (See "A")
- Automatic air vent for each tube eliminates loss of tube heating surface at the feed end of the dryer. (See "B")
- These extra advantages of the Ruggles-Coles Dryer mean continuous maximum output without operating attention and elaborate control devices.

Complete specifications upon request.
Bulletin 16-D-13



Cutaway of Ruggles-Coles Steam Tube Dryer showing spiral feeder, air vents, steam header and condensate siphon.

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Chances are Binks makes *exactly* the spray nozzles you need

for washing, cooling, processing, humidifying, dehydrating and hundreds of other applications.

Whatever your production or process requirements...you'll get the *right* spray nozzles quicker by calling Binks.

There is a size and spray pattern for every purpose...with nozzles cast or machined from standard or special corrosion-resistant metals and materials.

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Gives details on nozzle applications, sizes, capacities, spray patterns and metals. Easy to use selection tables.

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A COMPLETE LINE OF INDUSTRIAL SPRAY NOZZLES AND COOLING TOWERS

MAIL COUPON NOW

Check 4129 opposite last page.

are ejected.

High capacity is reported at relatively low bowl speed. Floor space and power requirements are minimized.

Centrifugals are available in three sizes ranging in capacity from 20 to 90 gph solids discharge. Bowl speeds vary from 4500 to 6000 rpm. Power requirements range from 7.5 to 35 hp. Units are available in either V-belt or direct drive.

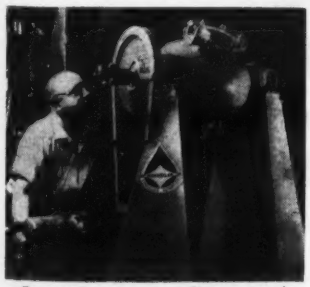
(Model PX self-opening centrifugal separators are product of The De Laval Separator Company, Industrial Division, Poughkeepsie, New York.)

Check 4130 opposite last page.

Production scale-up easy with one-foot conical dryer-blender

Glassed steel unit performs variety of operations

Uses: Drying or blending various materials, in small production, pilot plant, for laboratory amounts. Unit may also be used for impregnating products with liquids or gas,



Except for size, one-foot conical dryer-blender is identical to large production models

concentrating, reacting, or coating operations.

Features: Except for its size, conical dryer-blender is identical to large production models. Unit is ideal for use in production scale-up.

Description: One-foot conical dryer-blender has all interior surfaces coated with smooth, fire-polished glassed steel. This minimizes product adherence and assures maximum heat transfer. General

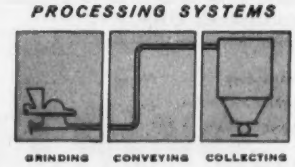
Continual expansion of the processing industries demands equipment designed and developed for *today*. Our MIKRO-BUD is an example of this type of planning. Recent changes in this vertical hammer mill were dictated by field tests on a variety of materials including cocoa, rubber accelerators, sodium sulphate, sugar, phenolic resins, dyes, colors and tobacco. Capacities have been stepped up from 40 to 100 per cent, depending on the material in process. Efficient air flow has added to the range of heat-sensitive materials handled without coolants. A selector control wheel allows adjustment over a wide range of particle sizes without shutting down the mill. Write for Bulletin 51-C-1.

The MIKRO-BUD is one of four different designs and 12 sizes of Mikro pulverizing equipment offering grinds from granular to the lower micron ranges, and capacities up to 20,000 lbs/hr on certain materials.

MIKRO-Products
PULVERIZING MACHINERY
Chatham Rd., Summit, N. J.
A Division of Metals Disintegrating Company
Division of American-Marietta Company

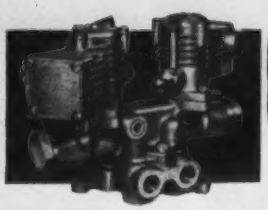
SPAN THE GLOBE

PROCESSING SYSTEMS



REPRESENTATIVES throughout the United States, Continental Europe, British Isles, Canada, Mexico, Central and South America, West Indies, South Africa, India, Japan, Philippines, Australia and New Zealand.
MANUFACTURING FACILITIES: United States, Canada, Continental Europe, British Isles.

Check 4131 opposite last page.



no coil burnout with

SPEED KING®

PILOT OPERATED CONTROL VALVES

Built to JIC standards • interchangeable pilots • choice of mounting types, optional features • ac or dc, any voltage • ¼ to 1 in. NPT.

SPEED KING solenoid pilot coils, potted in molded resin, are unconditionally guaranteed against coil burnout for the life of the valve!

And, SPEED KINGs are totally enclosed, sealed against entrance of dirt or moisture . . . are fully air-operated, for speed and dependability . . . feature a hard-chrome plated stainless steel plunger floating in O-rings, to eliminate wear-producing metal-to-metal contact.

For multi-million cycle dependability, specify Valvair® SPEED KING control valves.

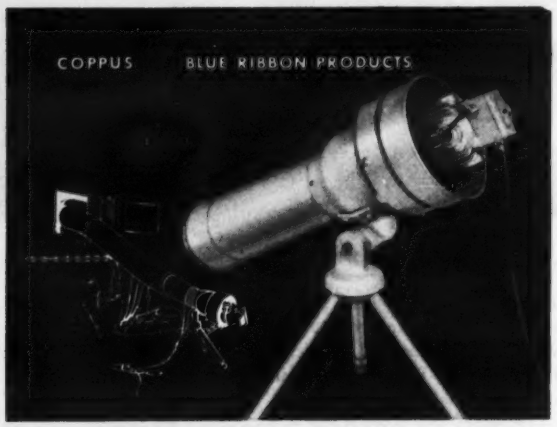
8007

Write for free Bulletin D-58. Address: Valvair Corp., Akron 11, Ohio, Dept. CP-360.

Valvair AKRON 11, OHIO

Other INDUSTRIAL DIVISIONS of IBEC: The Sinclair-Collins Valve Co. The Bellows Co., Akron, Ohio • V. D. Anderson Co., Cleveland, Ohio.

Check 4132 opposite last page.



COPPUS "Blue Ribbon" Vane Ventilators are portable and easily adaptable to practically any "fresh-air" requirement in industry. Mail coupon below for facts.

COPPUS ENGINEERING CORP.
383 Park Avenue, Worcester 10, Mass.

- ☐ in tanks, tank cars
- ☐ in underground manholes
- ☐ for exhausting welding fumes
- ☐ on boiler repair jobs
- ☐ for general man cooling
- ☐ to stir up stagnant air wherever men are working or material is drying

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Company.....
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City.....

COPPUS BLOWERS

Check 4133 opposite last page.

tumbling action, plus vacuum and heat, can cut drying time by as much as 90% when compared with conventional dryers.

(Further information about one-foot conical dryer-blender may be obtained from The Pfaudler Co., Division of Pfaudler Permutit Inc., 1102 West Avenue, Rochester 11, New York.)

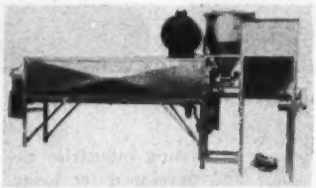
Check 4134 opposite last page.

Equipment coats seeds at rates up to 18 tons per hour

Applies either powdered or liquid protectants

Faster and better coating of seeds is being accomplished through use of an efficient seed processor. Unit applies thin, uniform, protective coating to all seeds. Up to 18 tons of seed per hour can be processed, using either powdered or liquid materials.

In operation, continuous stream of seed is fed into slowly revolving mixing chamber. Seed is sprayed with water mist or liquid protectant. Seed then passes



Seed treater features sectionalized construction

through cloud of chemical dust and mixing chamber. As seed is gently mixed, dust adheres to the moistened seed. When seed is completely coated, all liquid is absorbed, seed picks up no more dust, and is ready for discharge.

The unit features separate variable-speed motors for conveying seed and powdered protectant into mixing chamber. Heavy-duty motors operate mixing chamber and liquid system pump. Self-contained compressor supplies air for blowing powdered

HEATING ELEMENTS

Designed to *Your* Specifications

TUBULAR HEATERS
for Tanks, Kettles, Baths, Extruders

STRIP HEATERS
for Ovens, Dryers, Process Equipment

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The Complete Line of TRENT Metal Sheathed Heating Elements Assures On-the-Spot Controlled Heat to Your Most Exacting Requirements.

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NEW! BLACKMER

VARI-FLO PUMPS and PROPORTIONING SYSTEMS

You'll benefit from new economy and efficiency with Blackmer rotary Vari-Flo Pumps and Proportioning Systems for stream blending of liquids or transferring liquids at varying flow rates from the same pump. Eliminates the need for variable-speed motors, makes old-fashioned batch blending cumbersome and obsolete, saves costs and adds efficiency to a variety of processes.

FREE CATALOG!
Write for free Vari-Flo Pump Bulletin No. 600

"liquid materials handling"® equipment

BLACKMER PUMP COMPANY
Grand Rapids 9, Michigan

Check 4136 opposite last page.

chemical into mixing chamber.

Sectionalized construction of unit permits seed and canning companies to use and purchase only the sections of the seed treater they need.

(Seed treater is product of O. W. Kromer Company, 1120 Emerson Avenue N., Minneapolis 11, Minn.)

Check 4137 opposite last page.

NEW LITERATURE
Processing Equipment

Differences between a homogenizer and a colloid mill are discussed in four-page bulletin. How to choose correct unit is also told. Photographs and drawings are included. Homogenizer-Colloid Mill Bul — Manton-Gaulin Manufacturing Co., Inc.

Check 4138 opposite last page.

Standard methods for evaluating dust concentrations in work areas are reviewed in 15-page book. Dust Topics — Gelman Instrument Company.

Check 4139 opposite last page.

Five-way savings that can be achieved with continuous belt drum filter are explained in 12-page bulletin. Drawings show operation of unit. Performance reports are also included. Bul F-2053 — The Eimco Corporation.

Check 4140 opposite last page.

Full line of dispersers, including laboratory and production units, are described in brochure. Mill head adjustment that assures positive control is also described. Brochure #8-D — Charles Ross & Son Company.

Check 4141 opposite last page.

Fluid bed dryers, design and operation, are discussed in four-page bulletin. Drawing illustrates typical drying system. Bul 88 — Raymond Division, Combustion Engineering, Inc.

Check 4142 opposite last page.

Continuous drying units are pictured and described in four-page folder. Manufacturer's facilities are also shown. Bul 447 — Proctor & Schwartz, Inc.

Check 4143 opposite last page.

RAYMOND

Flash Drying

with fine disintegration of material

IN making certain types of powdered products which involve a drying operation, but no pulverizing, the Raymond Cage Mill Flash Drying System gives definite advantages in handling the job.

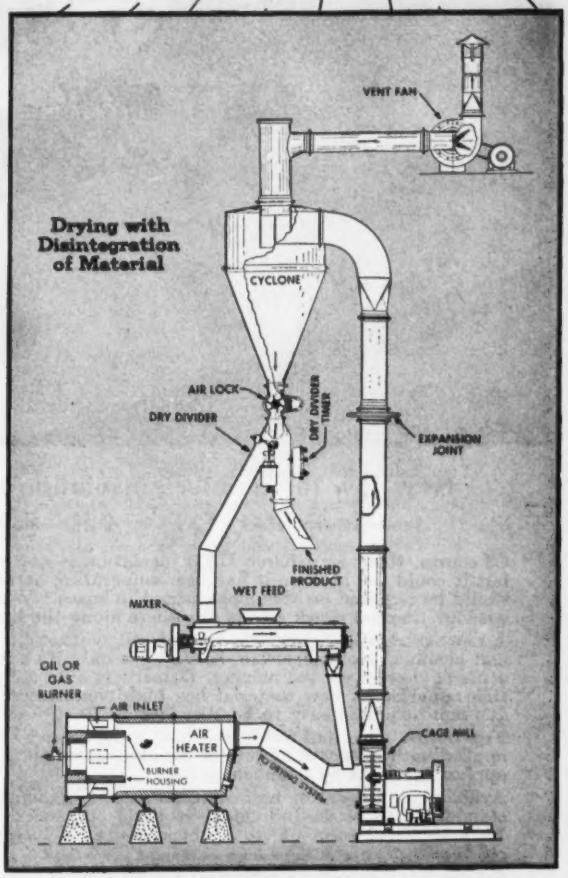
The Cage Mill disintegrates the material to normal particle size and simultaneously reduces the moisture to a specified final content, delivering a fluffy, free-flowing finished material.

Drying is instantaneous, and the small amount of fine material in the system at a time insures close control of the final moisture. This is important in handling heat-sensitive products.

High thermal efficiency plus clean, safe, dust-free, automatic operation are factors that simplify the process and add to the economy of the whole operation.

The system is flexible in application and, where pulverizing is necessary, the Raymond Imp Mill may be used in place of the Cage Mill.

Write for further details and tell us your requirements.



This flow sheet shows a typical set-up for the Raymond Flash Drying System. The Mixer unit is used for adding a portion of the dried material to the wet feed . . . to disperse the moisture and permit efficient drying of the product. For processing treated clays, corn gluten meal, filter cake and similar materials.

COMBUSTION ENGINEERING, INC.
Raymond Division

1116 WEST BLACKHAWK ST.
CHICAGO 22, ILLINOIS

Combustion Engineering-Superheater, Ltd., Montreal, Canada

SALES OFFICES IN PRINCIPAL CITIES

Check 4144 opposite last page.

HANDLES "MOON" TEMPERATURE EXTREMES!

New low temperature insulation handles jobs in − 300° F. to + 220° F. range

Of course, this new Unarco U200 insulation is not in use on the moon . . . but it could be, because it handles temperature extremes even greater than would be required on this bleak island in space.* What's more U200 does it without thermal shock effects anywhere along the line.

A new, extremely lightweight, closed cell synthetic, U200 has excellent heat and chemical resistance. Its K factor is only 0.14 at 70° F. mean temperature . . . lowest on the market. Density is only 2.3 lb. per cubic foot. Yet this remarkable, new material has high compressive and flexural strength. It's non-toxic and easy to handle, too.

Try it just once and you'll see how quickly and easily it can be cut and applied with a very minimum of standard hand tools. It can actually reduce application costs by as much as 50%.

Available in accurate, half-round sections; in nominal thicknesses and in standard pipe sizes. Individual sections 36 inches long. Also available in 12" x 36" block form—1" to 5" thickness in ½" increments.

(*) *−243° F. to +214° F. Estimated moon temperatures as listed in a leading American encyclopedia.*

Get complete engineering specifications and other details before another day goes by.

Write today on your company letterhead for Unarco Bulletin No. U200-1.

MILLIONS OF CLOSED CELLS MAKE U-200

- **Waterproof**
- **Vapor Resistant**
- **Efficient**
- **Lightweight**
- **Easy to Handle**

*Closed cell content of 85% plus.

U-200 *The Insulation with "Handleability"*

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UNARCO PRODUCTS

• UNIBESTOS, Amosite Asbestos Pipe Covering and Block • Calcium Silicate Pipe Covering and Block • 85% Magnesia Pipe Covering and Block • Mineral Fiber Block • Wrap-On Insulation • Lace-On Insulation • Turbine Blankets • Insulating and Finishing Cements • Asbestos Textiles • Packing and Gasketing.

UNION ASBESTOS & RUBBER COMPANY

Fibrous Products Division • **Dept. 202, Bloomington, Illinois.**

Check 4145 opposite last page.

PROCESSING EQUIPMENT

Rotary drying equipment—its design, construction, application, and operation, are reviewed in 16-page bulletin. Fluidized bed dryer for processing particles up to 0.25" diam is also described. Bul 59L —Louisville Dryer Div., General American Transportation Corporation.

Check 4146 opposite last page.

Hammer mills are topic of eight-page bulletin. Capacity charts and specifications of various models are listed. Actual installations are shown. Bul H-850 — Gruendler Crusher & Pulverizer Company.

Check 4147 opposite last page.

Mist eliminator comparison chart cites density, style, and use of wire mesh entrainment separators. Comparison data for units made by other manufacturers are also listed. Mist Eliminator Comparison Chart — Schuyler Manufacturing Corp.

Check 4148 opposite last page.

Particle size reduction equipment, including homogenizers, colloid mills, and dispersers are topic of 32-page illustrated catalog. Over 600 users are listed. Particle Size Reduction Equipment Cat — Tri-Homo Corporation.

Check 4149 opposite last page.

Selection data for dryers is included in 12-page catalog. Photos, diagrams, and drawings illustrate various drying methods and their features. "Drying Equipment" — J. P. Devine Mfg. Company.

Check 4150 opposite last page.

Heat transfer equipment is pictured and described in 22-page bulletin. Over 50 photographs of custom design units are included. Bul HE-8 — Henry Vogt Machine Co., Incorporated.

Check 4151 opposite last page.

Tower packings are subject of one-page folder. Advantages of polyethylene packing are also described. "Tower Packing" — Knox Porcelain Corporation.

Check 4152 opposite last page.

Gravity-flow, countercurrent extraction as performed with rotating-disc column is explained in two-color, eight-page brochure. Photographs show how variation in rotor speed controls drop size. Chart compares performance of rotating disc unit with conventional column. Bul T-1159 — Turbo-Mixer Division, General American Transportation Corporation.

Check 4153 opposite last page.

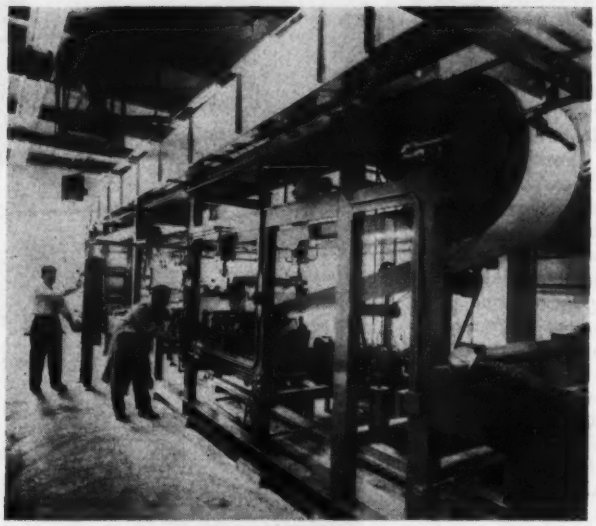
Mill Conditions Mirrored By Pilot Paper Coater

Inadequacy of bench testing in simulating full-scale paper-coating mill conditions, coupled with desire to penetrate new research areas, has led National Starch and Chemical into puchase of a pilot unit which is only inches away from the real thing

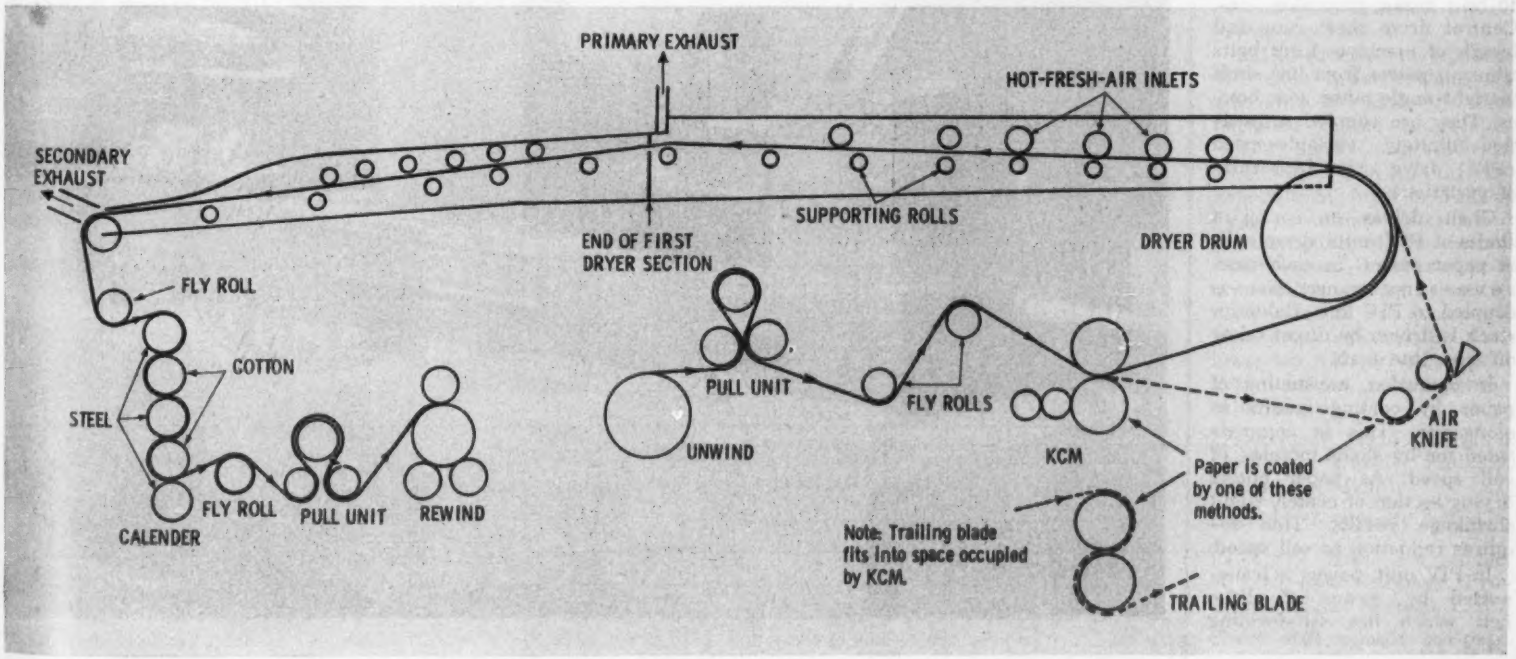
New research vistas have been opened up by installation of a pilot-plant paper coater, at National Starch and Chemical Corporation's Alexander Research Laboratories in Plainfield, New Jersey. Coater is also expected to help eliminate costly delays and waste often encountered when materials are introduced to mill equipment for first time.

Machine is basically similar to full-size mill equipment, except in roll width. It is capable of coating, drying and calendering (both super and machine) in one continuous operation. Coater can also be set-up to calender independently of coating and drying stages.

Paper coater will do all six major types of coating and sizing processes as they are performed by latest mill equipment—air knife, trailing blade, roll, reverse roll, size



In foreground (partially obscured) is air hose leading to air-knife coating apparatus. Large drum (top, forward) is 1200-lb steam-heated dryer unit, leading paper into overhead dryer tunnel which runs full 45' length of machine



press and modified size press. In near future rolls will be added for gravure and offset-gravure coating.

Determining machining characteristics of a starch or synthetic material by bench testing was considered inadequate by National Starch. Such methods did not necessarily insure paper producers that materials would react in full-scale production the same way they did in laboratory.

Since coater runs under laboratory control conditions, it permits isolation of many variables that contribute to unpredictable nature of paper production. For first time large quantities of coated stock can be prepared to conduct printability tests. Determination can be made as to how various materials react to inks and printing-plate pressures under commercial-printing conditions.

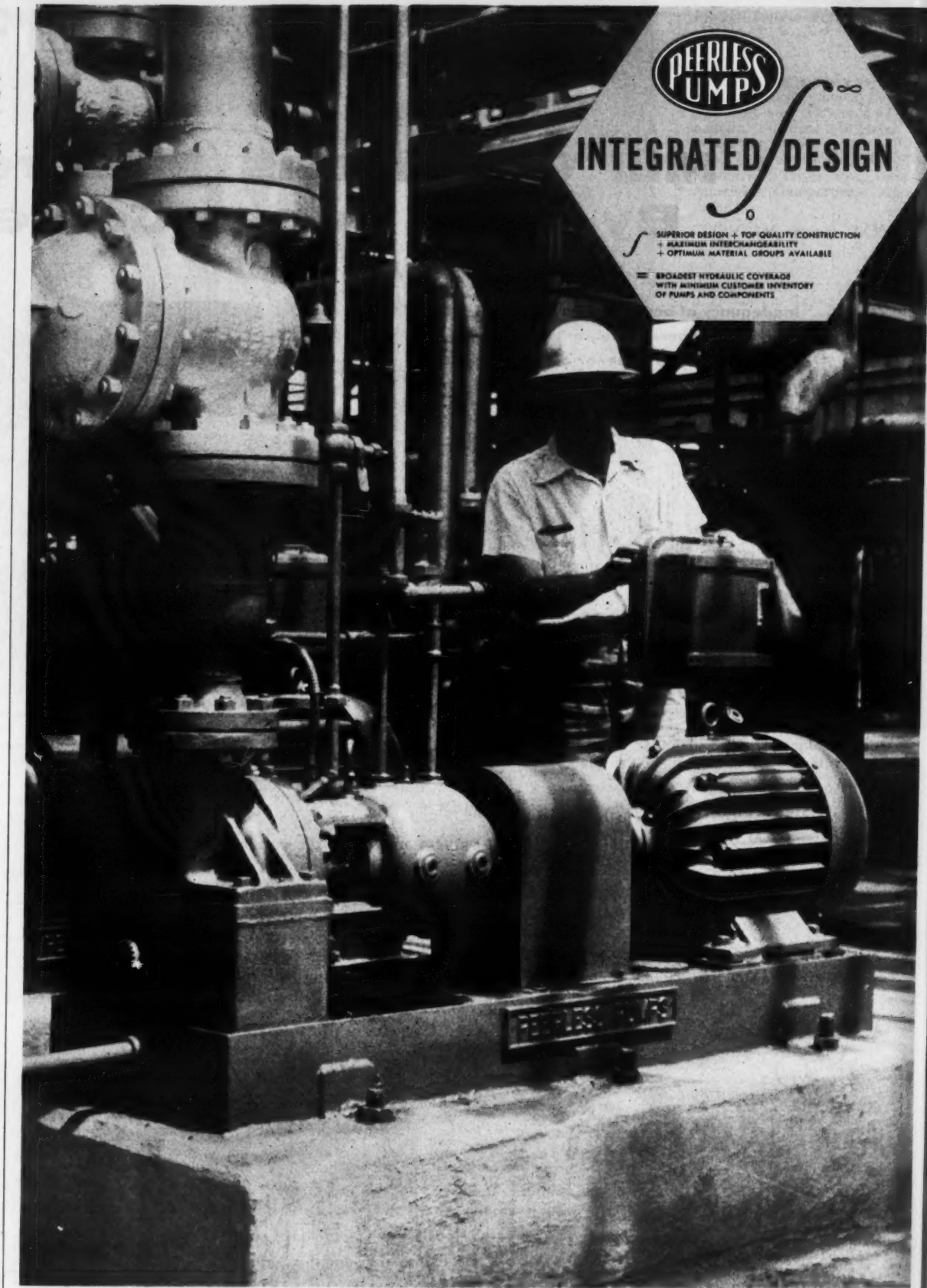
Coater is also expected to play an integral role in developmental activities, in areas of improved water-resistant-binder systems, lightweight coating methods for publication papers, research on cationic starches for coating binders, resin materials for functional coating purposes, and improved methods of coating with standard binders.

Paper coater is powered by 40-hp motor-generator set. Central drive shaft runs full length of machine. Link belts transmit power from line shaft to right-angle miter gear boxes. They are coupled to positive-infinitely variable-speed (PIV) drive units (4:1 ratio of variation).

Chain drives, on output shafts of PIV units, drive rolls in paper coater. In each case, reversing transmission is coupled to PIV unit. Calender stack is driven by direct take-off from line shaft.

In operation, moistening of paper by coating results in elongation. This is compensated for by slight increase of roll speed. As paper enters drying section of coater, slight shrinkage results. This requires reduction in roll speed.

In PIV unit, power is transmitted by means of drive belt which has self-forming

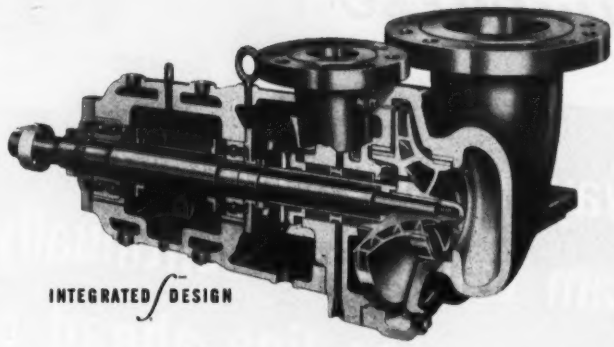


MEANS YOU CAN QUICKLY MODIFY THE SAME PUMP FOR DIFFERENT CAPACITIES

Component interchangeability permits desired pump to be assembled from standard components in a minimum of time.

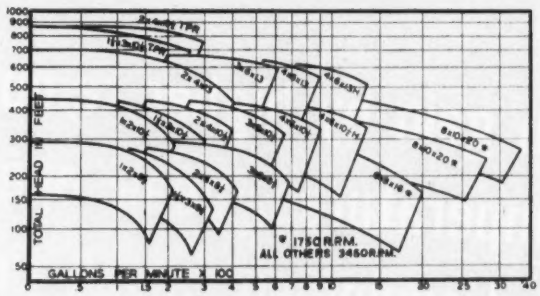
Recently a large process plant in the gulf coast decided to increase its output. In the process of redesign it became necessary for a particular group of pumps to handle double their capacity. Because these pumps were integrated Peerless Type PR units, the solution was simple. By merely changing the impeller and volute, these pumps were ready to handle the higher pumping capacities required.

Unusual example? Not at all. Rather it is typical of the versatility designed and built into this line of high pressure, high temperature Peerless process pumps. Peerless PR and PRS pumps offer many other advantages. Virtually all liquids in refining processes can be pumped by these units. Widest capacity and head conditions are easily met. And the maximum interchangeability factor materially reduces inventory costs. Get the best for process pump needs, specify and buy Peerless. Send for informative Bulletin No. B-1605 now.



PEERLESS PR AND PRS PUMPS ARE AVAILABLE IN 1" TO 8" SIZES INCLUSIVE

Designed to handle hot oil, hot water, hydrocarbons and many chemicals used in the process industries. Capacities to 3000 gpm. Heads to 700 feet. Type PR (packing gland construction) handles temperatures to 850° F. Type PRS (mechanical seal) handles temperatures to 250° F. Liquid ends available in any machineable metal. Electric drive is standard: other drives as required.



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PEERLESS PUMPS

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fmc FOOD MACHINERY AND CHEMICAL CORPORATION

Peerless Pump HYDRODYNAMICS DIVISION

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Distributors in principal cities.
Consult your telephone directory.

Peerless Pump, Hydrodynamics Division, Food Machinery and Chemical Corporation
301 West Avenue 26, Los Angeles 31, California

Please send me Bulletin B-1605 ☐ Have field engineer contact me ☐

Name_____

Address_____

City_____

State_____

CP

Check 4154 opposite last page.

metal teeth. These engage with radial grooves in two pairs of cone-shaped wheels. Positive power transmission is thus available at all speeds, regardless of load.

Speed of central shaft varies inversely with amount of DC power shunted off motor-driven generator. Full application of DC control power completely brakes motion of drive shaft. Manual clutch is installed between rewind and other sections of machine to disengage coater units when operating calender only.

Paper Coater Data

Length, ft	45
Height, ft	10½
Roll faces, ft	2
Paper width, inches	20 to 22, max
Maximum speed, fpm	2000
Number of driven rolls	12

All coating rolls are variable in ratio of 50 to 200% of drive input and may be operated in either direction. Trailing blade utilizes adjustable lucite dams with spring-loaded faces. Blade has three controls for automatic positioning, and complete movement in every direction. It incorporates a standard flexible spring-steel blade.

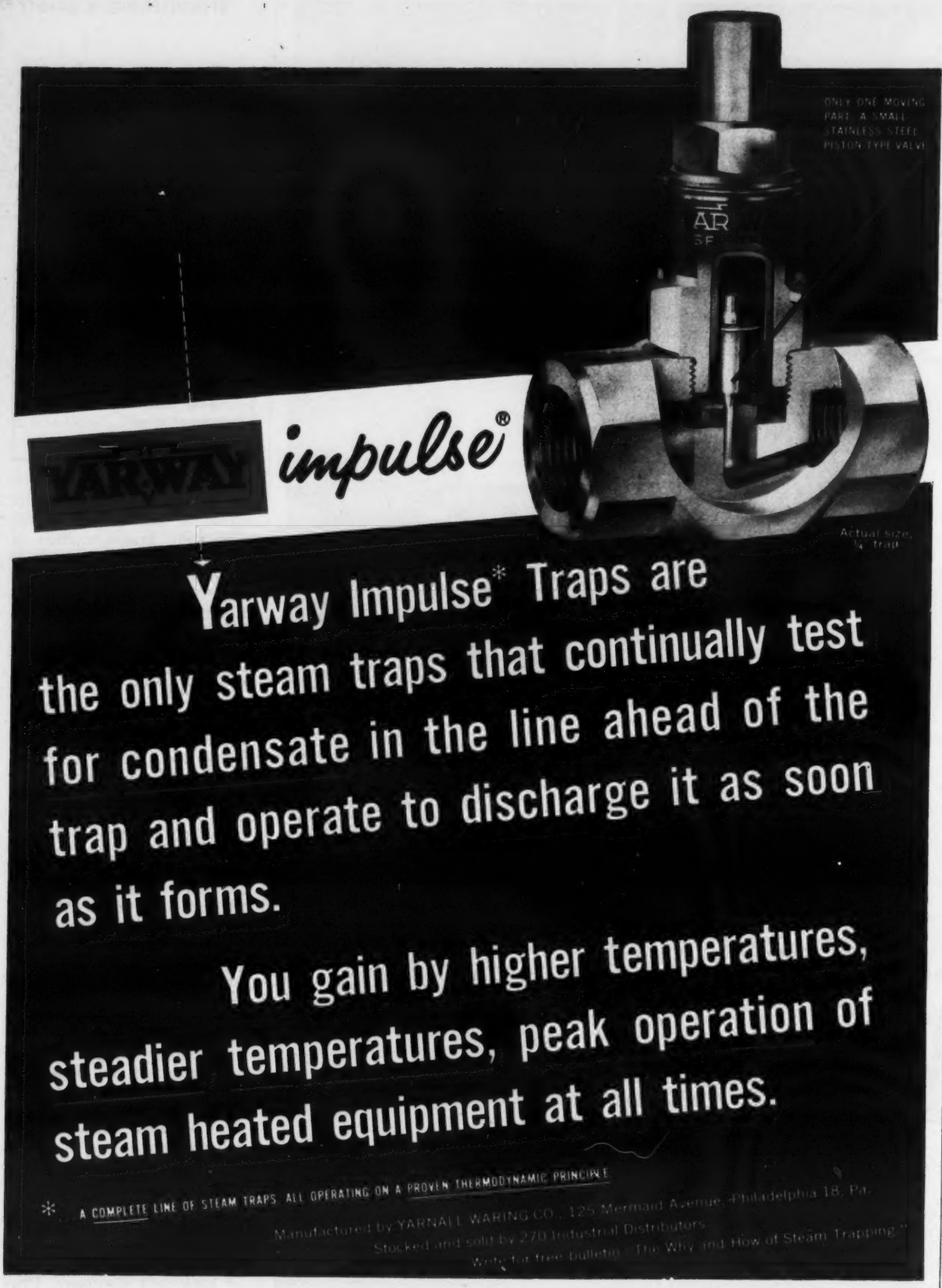
KCM process incorporates 16" diam brass backing roll (driven), 16" diam 85 P&J hardness bottom (applicator) roll, 8" diam chrome roll, and 12¾" diam 60 P&J hardness gate roll. Air knife is Waldron Type-A, Uniflow Microjet. It is supplied by 10-hp centrifugal blower. Unit has standard coating trough, coating-applicator roll and breast roll. Size press utilizes 16" diam brass top roll (driven) and 30 P&J hardness rubber bottom roll (driven).

(Pilot-plant paper coater is product of Wheeler Roll Co., Kalamazoo, Mich.)

Check 4155 opposite last page.

(V-2 PIV drives are product of Link-Belt Company, Prudential Plaza, Chicago 1, Ill.)

Check 4156 opposite last page.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Actual size, ¼" trap
Yarway Impulse* Traps are the only steam traps that continually test for condensate in the line ahead of the trap and operate to discharge it as soon as it forms.
You gain by higher temperatures, steadier temperatures, peak operation of steam heated equipment at all times.
* A COMPLETE LINE OF STEAM TRAPS, ALL OPERATING ON A PROVEN THERMODYNAMIC PRINCIPLE
Manufactured by YARNALL WARING CO., 125 Mermaid Avenue, Philadelphia 18, Pa.
Stocked and sold by 270 Industrial Distributors
Write for free bulletin "The Why and How of Steam Trapping"

Check 4157 opposite last page.

Fouled resin beds thoroughly cleaned

A recently introduced cation exchange resin cleaner is said to be particularly effective in cleaning fouled resin beds and restoring exchange capacity to an efficient level in any softener requiring salt regeneration. Cleaner is blend of selected inorganic chemical agents with high dissolving and dispersing properties.

Solution of cleaner reacts with iron, aluminum, carbonates and similar coatings to form soluble complexes. These are removed from beds by backwashing and rinsing. At same time, cleaner, through loosening of caked resin, permits removal of entrapped silt.

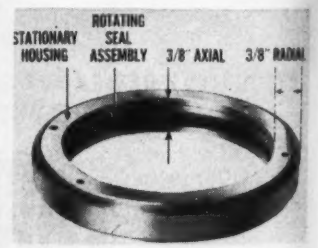
(Exchange resin cleaner 1112 is product of The Permutit Co., Division of Pfaudler Permutit Inc., 50 W. 44th St., New York 36, N.Y.)

Check 4158 opposite last page.

Differential of 30 psi fails to hamper shaft seal

Uses: Shaft-sealing applications.

Features: Seal is suitable for temperatures to 450°F. It resists pressure differentials



Self-contained mechanical seals are suitable for temperatures to 450°F, resisting pressure differentials in one or both directions to 30 psi at shaft speeds to 15,000 sfm

in one or both directions to 30 psi, at shaft speeds to 15,000 sfm.

Description: Self-contained mechanical seal incorporates rigid enclosure for revolving assembly. Spring-loaded split

grip ring transfers rotation from shaft to seal assembly. Primary seal is accomplished in contact between ground carrier face and polished side plate. Mating surfaces are lapped flat to within two light bands.

Heat transfer is achieved by use of pressure-relief vents in side plate on wet side.

Action of revolving seal assembly causes lubricant drawn into seal to be recirculated under centrifugal pressure back out through pressure-relief vents.

Enclosed seal assembly revolves with shaft with two-point static shaft contact. Units are available for shaft sizes ½ to 8" diam.

(Mechanical shaft seals are product of Seal Division, The Universal Grinding Corp., 2200 Scranton Rd., Cleveland, Ohio.)

Check 4159 opposite last page.

Teflon pipe sealer

. . . in tape form seals all types of threaded connections. It will safely handle most industrial acids, corrosives, caustics, hydraulic fluids and aromatic fuels. Temperature range is −250 to +500°F.

Tape can be used on plastic, aluminum, stainless-steel, ceramic, synthetic-rubber and carbon pipe. Self-lubricating sealer is available in ½ x 288" rolls.

(Tape pipe-joint sealer is product of Crane Packing Co., 6400 Oakton St., Morton Grove, Ill.)

Check 4160 opposite last page.

CHECKUP on your Control Valves... CHECKOFF these Annin Advantages*

***Any other source might give you a few... but with Annin you get them all!**

MINIMUM number of parts per complete valve.

OVER 60,000 successful case histories of split body valve applications.

POSITIONING ACCURACY guaranteed, .001 inch per inch of stroke.

CONSTANT INSTRUMENT signal sensitivity throughout signal range.

COMPLETE INTERCHANGEABILITY of any Domotor valve to on-off pneumatic control, pneumatic hydraulic, electro hydraulic, electro pneumatic or manual actuator.

ENGINEERED FOR MANUAL control with any of the above automatic actuators, if desired, at minimum cost.

SIMPLIFIED ADDITION of high speed booster units to any pneumatic positioning actuator.

ADAPTABILITY of bellows seal, doolseal or plain extension to any standard valve.

BODY SIZES from ¼" up.

COMPLETE LINE of body ratings: 600—1500—2500 lbs. ASA; special 10,000 and 60,000 psig design, temp. —450°F to 1600°F.

CONVERSION FROM globe body to angle body construction with only one additional part.

ADAPTABILITY TO 3-WAY Valve Construction with minimum parts and cost.

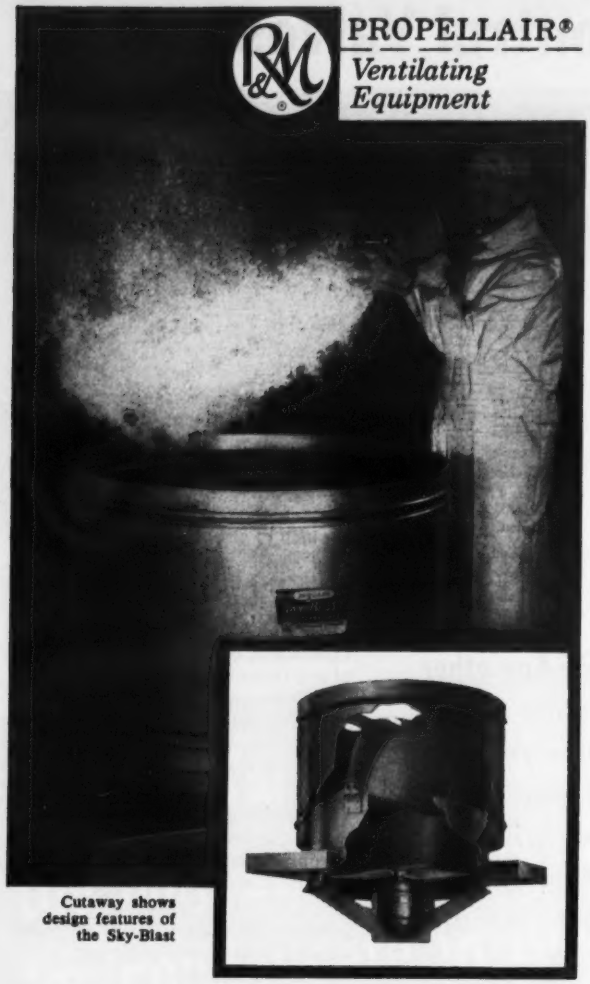
MINIMUM COST for change from soft seat construction to hard seat, or vice versa.

First in a series of checklists on Annin features.

Annin VALVES

THE ANNIN COMPANY
1040 South Vail Avenue
Montebello, California

Check 4161 opposite last page.



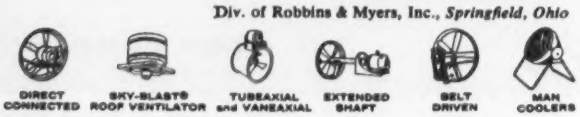
Cutaway shows design features of the Sky-Blast

PROPELLAIR®
Ventilating Equipment

Free-Flow SKY-BLAST® Roof Ventilators are *WEATHERPROOF!*

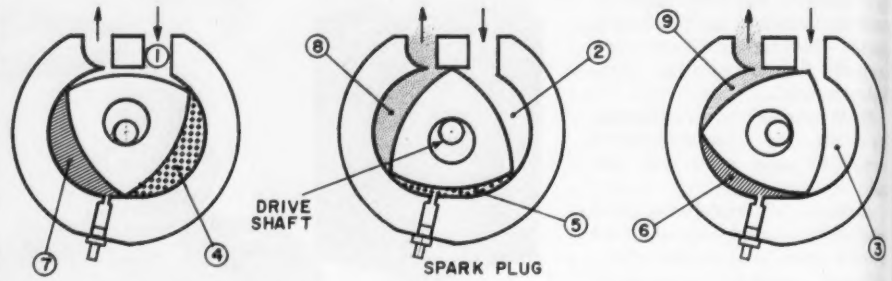
Even if the rain comes down in buckets, there's no need for weather covers on SKY-BLAST roof ventilators. In operation, the powerful airstream keeps out snow, rain and sleet. At rest, butterfly dampers form a water-tight seal, won't leak a drop. With no interfering covers, more air is moved at less cost. Fumes are thrown high in the air to prevent re-entry into the building and to eliminate roof maintenance problems created by other types of ventilators. Wind velocity or direction can't affect performance. Heavy gage steel surfaces are hot-dip galvanized for real sou'wester protection. With patented, non-clogging rainshed, low wind guard, rugged base and condensate drain, it's always fair weather beneath a SKY-BLAST. Wind tunnel proven ratings to 78,000 cfm. Send for bulletin 680—CP

PROPELLAIR®
Div. of Robbins & Myers, Inc., *Springfield, Ohio*



MOVING AIR IS OUR BUSINESS®

Check 4162 opposite last page.



1 - Intake
2 - Intake
3 - Intake
4 - Compression
5 - Compression (Spark)
6 - Power
7 - Power
8 - Exhaust
9 - Exhaust

Numbers follow "life" of one pocket as rotor passes through one revolution

Pistonless combustion engine has only two moving parts

A 6 x 8" 22-lb model delivers 28.6 metric hp

USES: Conventional internal-combustion-engine applications. Industrially in such items as pumps, compressors and generators.

Features: Pistonless internal-combustion engine has only two moving parts —rotor and crankshaft. A 22-lb model, eight inches in diameter and six inches long, develops 28.6 metric hp.

Description: Three-sided rotor operates within slightly pinch-wasted oblong chamber. Sides are curved. All three corners of triangle stay in contact with chamber wall at all times during eccentric orbit of rotor. Each corner is tipped with inset metal strip which maintains gas-tight contact with chamber wall. Thus, each side of rotor, together with chamber wall, forms separate gas-tight pocket. The three pockets so formed vary back and forth from minimum- to maximum-volume conditions as rotor revolves. All have same maximum and minimum volumes.

At start of four-stage cycle minimum-volume pocket begins intake of fuel-air mixture. Intake cycle ends as volume reaches maximum and pocket passes intake port completely. Following one-half revolution of rotor, volume is at minimum and compression cycle has ended.

Single spark plug of engine now fires. At end of the power stroke, pocket volume is again at maximum. As pocket passes over exhaust port, final or exhaust cycle begins, ending with original minimum-volume situation. Rotor has now completed one revolution. Remaining two pockets pass through same cycle.

Planetary gear inside rotor rotates crankshaft three times for each revolution of rotor. Maximum shaft speed is 17,000 rpm. This is speed at which 22-lb test engine developed 28.6 metric hp. Reportedly no wear was shown on inset metal strips after 300 hours of top-speed operation. Fuel consumption is said to be low, and low-octane fuels can be used.

(Wankel rotating internal-combustion engine is joint development of NSU Werke Motor Company, Neckarsulm, West Germany, and Curtiss-Wright Corp. Further information concerning engine may be obtained from Curtiss-Wright Corporation, 304 Valley Boulevard, Wood-Ridge, New Jersey.)

Check 4163 opposite last page.

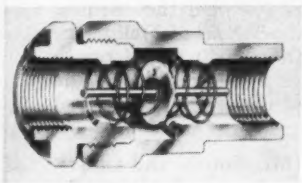
Break in hose or pipe shuts off flow

Uses: Shut-off of gas or liquid flow in ruptured hose or pipe.

Features: Valve instantaneously shuts off flow of gas or liquid when break occurs in hose or pipe beyond valve.

Description: Safety valve consists of brass housing, valve disc and two springs on either side of valve disc. In normal operation, flow of air is not impeded by valve disc. This is because free area around disc is equal to inside diameter of supply pipe, and pressures on both sides of disc are roughly equal.

When break occurs beyond valve, pressures downstream and upstream become unequal. This causes the valve disc to close on valve seat,



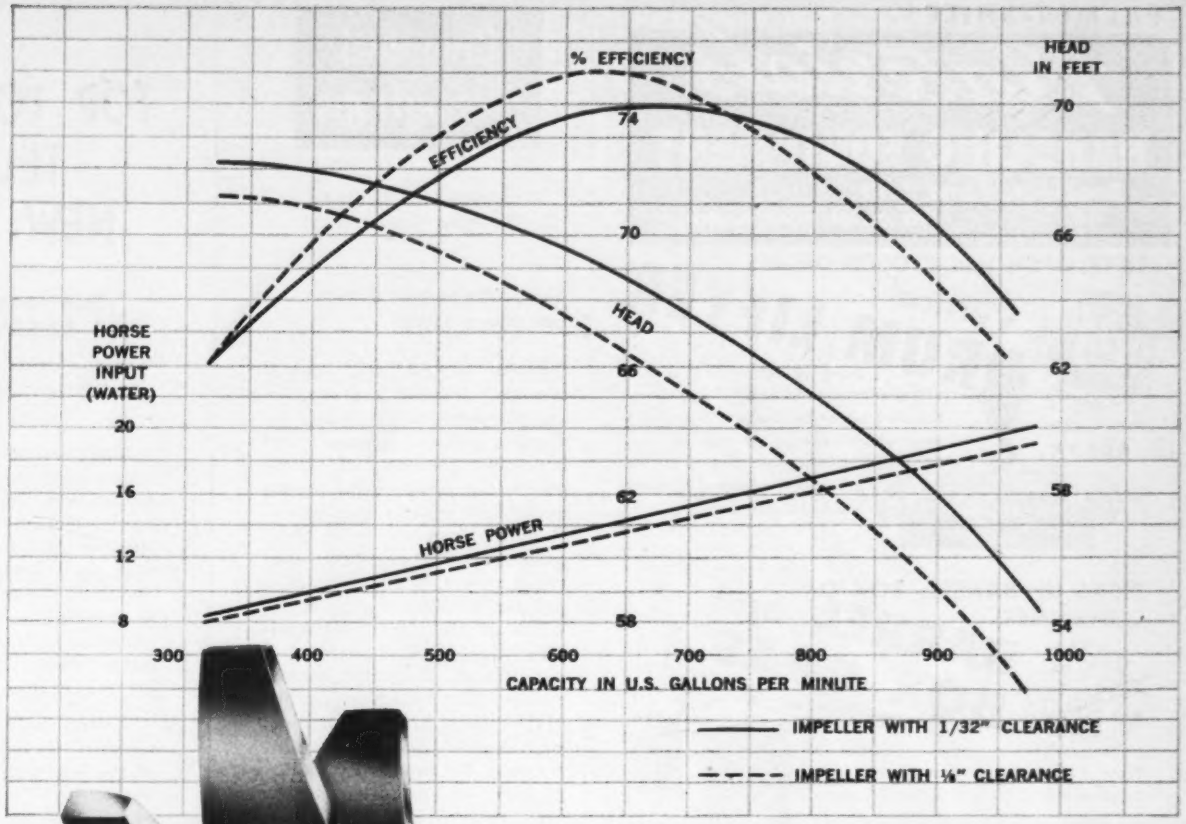
Safety valve is designed to shut off flow of gas or liquids instantaneously upon break in hose or pipe beyond valves

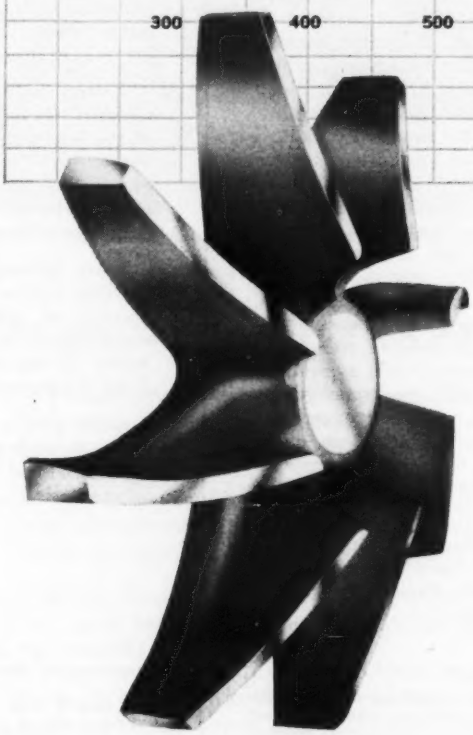
instantaneously stopping air flow. Hole in valve disc permits small amount of air to escape into hose, even when valve is closed. When break has been repaired, this escaping air gradually builds up pressure in hose. When pressures are equalized, disc is moved into open position by two springs.

Other valves, designed for gases or liquids which must not escape, permit resetting after break has been repaired before normal operation has been resumed. Valves are available in all diameters of hose or pipe, for pressures to 125 psi or higher, and for flows of 15 to 190 cfm, or to any specifications.

(Safety valves are product of Sands Safety Valve Company, 3606 Federal St., Camden 5, N.J.)

Check 4164 opposite last page.





The Impeller that *KEEPS ITS YOUTH*

Your concern for the efficiency of a centrifugal pump shouldn't cease just because you've seen it operating acceptably upon installation. As time goes by and internal clearances are increased by wear and corrosion, will you continue to get the performance you expect?

If you've specified a LaBour Type Q or Type SQ, the answer is, "Yes." That's because these pumps use no sealing rings or other critical close-running parts on which efficiency depends.

Compare the two performance curves of a typical LaBour pump with standard initial clearances and the same pump after clearances had been deliberately made four times as great. This is real preservation of youthful vigor—and it's done with an open impeller.

ORIGINAL MANUFACTURERS OF THE SELF PRIMING CENTRIFUGAL PUMP

LABOUR

THE LaBOUR COMPANY, INC. • ELKHART, INDIANA, U. S. A.

Check 4165 opposite last page.

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Materials
HANDLING EQUIPMENT
Engineered and Built to meet your needs

LIFTS OPEN and CLOSED DRUMS

Vertical DRUM LIFTER

Item C-1258
$54.75

Save valuable plant space with this improved Vertical Drum Lifter. Handled either by crane or hoist, and used where ceilings are high or low. Sure-hold safety-grip is one of its important features. All steel welded construction.

PICKS UP BARREL, BOX OR CONTAINER

BARREL and BOX GRAB

Item NS-288
(2000 lb. capacity)
$87.55

From 40" diameter to small nail keg. Available in 1000 and 2000 lb. capacity. Toggle principle design. Rugged construction of welded steel chain with tongs of heavy bar stock. Weight app. 35 lbs.

Item NS-288-L
$76.45

BARRELS WEIGHING UP TO 1000 LBS. HANDLED WITH EASE BY A

BARREL TRUCK
loads automatically

Loads from a row as easily as when barrel stands alone. Only 24" wide, permitting passage thru doors or down aisles too narrow for many trucks. All welded steel construction. Weight app. 85 lbs.

Item S-911-M $54.15
(metal wheels)
Item S-911-R $60.25
(rubber wheels)
Item S-911-P $71.75
(pneumatic rubber wheels)

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Check 4166 opposite last page.

Chemical Boobytraps

Unsuspected hazards awaiting the unwary

Skin lotions and creams can harm eyes

Many lotions and creams provide excellent protection against dermatoses caused by various dusts, greases and solvents. Certain of these agents can produce temporary visual and optical impairment if gotten into the eyes. Such involuntary application may easily occur when material is put on face, when goggles are adjusted and when perspiration is removed from face.

Although producing considerable discomfort, irritation of the eyes is less hazardous than visual disturbance. Latter may be caused by failure of lachrymal secretions to wet lens surface evenly, producing distortion and sense of haziness. Combination of discomfort and loss of visual acuity can readily contribute to occurrence of serious accidents.

Compounds containing dimethylpolysiloxane are among those causing such symptoms. Hazard may be removed by using protective creams and lotions which have no effect on eyes. This hazard may be minimized by education of employees.

(Contributed by John B. Walters, Sr., Plant Chemist, Marler Chemical Company, Cleveland, Tenn.)

Antimony exposure can be disastrous to persons with history of heart disease. This fact is pointed out in a hygienic guide for antimony, one of four such recently announced publications. All guides provide confirmed data relative to degree of hazard in industrial exposures, specific medical procedures to follow in event of poisoning, as well as tested procedures for identification and control. Each guide contains a bibliography of literature published to date. Antimony, Ethylenediamine, Hydrogen Selenide and Styrene Monomer Hygienic Guides are available at $0.25 each from American Industrial Hygiene Association, 14125 Prevost, Detroit, Mich.

TOP TOXICOLOGISTS TELL ABOUT NEW FOOD LAW

See page 28 this issue of CHEMICAL PROCESSING

Read comments of the men who are best able to interpret the results of additive tests

Many articles have been written about the far-reaching repercussions of the Food Additives Amendment, with its highly controversial Delaney clause, which becomes fully effective March 5, 1960. However, none we have seen have approached the subject by obtaining the opinions of those men primarily responsible for the safe use of chemical additives in foods — the toxicologists themselves. How did CHEMICAL PROCESSING hit on this approach?

Several months ago CP associate editor Gordon Weyermuller attended the opening of the Bushy Run Laboratories of Mellon Institute near Pittsburgh. Here he met Henry F. Smyth, Jr., who directs the activities of the laboratories in testing the safety of chemical additives in foods.

From talking to Mr. Smyth and others, Gordon evolved the idea of obtaining the opinion of some of the most outstanding toxicologists in the country and perhaps the world on the implications and effects of the Food Additives Amendment.

After you've read the article starting on page 28, perhaps you'll want to send us your opinions. Send comments to:

Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Ill.

These men are among the most outstanding of the professional toxicologists in the United States

Dr. Don. D. Irish
The Dow Chemical Company

Dr. John A. Zapp, Jr.
E. I. duPont de Nemours & Co.

Henry F. Smyth, Jr.
Mellon Institute and Union Carbide Corporation

Dr. Bernard Oser
Food & Drug Research Laboratories, Inc.

Dr. John P. Frawley
Hercules Powder Company

Dr. C. Boyd Shaffer
American Cyanamid Company

Dr. Joseph F. Treon
Atlas Powder Company

PROBLEMS?

Interested in solving them?

Want to learn new ways of improving your plant operation and, thereby, realize savings?

In each . . .

issue of CHEMICAL PROCESSING there are articles that will help you solve many of your operational problems.

These "New Solution" stories appear in the "New Solutions" section which begins on page 51 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

"New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few.

For more information on product at right, specify 4167 see information request blank opposite last page.

FALK All-Motor Motoreducers driving pipe conveyors in seamless tube mill.

Photo courtesy of
The Colorado Fuel and Iron Corporation

You get these "extras" when you buy FALK *all-steel* Motoreducers

1. **Freedom from damaged housings.** The exclusive FALK *all-steel* construction gives full protection from cracked housings or torn-off feet...plus twice the ability of cast iron to maintain vital alignment.
2. **Inherently stronger gear teeth.** By AGMA standards, Falk extra-depth, high pressure angle helical gears are inherently stronger than ordinary helical teeth, thus assuring reliable operation and longer gear life.
3. **Highest known gear efficiency**—98½% per gear mesh under full load! This means maximum productive work for your power dollar.
4. **Longer service life**...advanced FALK design makes it possible to machine both bores for each shaft assembly at one time, thus eliminating possible accumulation of tolerances that occurs when individually machined parts are assembled. The result—better alignment of revolving elements that permits units to transmit rated capacity longer.
5. **Standard units to fit your needs.** Integral and All-Motor® Motoreducers are available in horizontal, vertical and right angle types...a type for every use.

Units are available up to 75 hp; output speeds from 780 rpm down to 1.2 rpm. Prompt delivery from factory, warehouse or distributor stocks.
Ask your FALK Representative or Authorized FALK Distributor for *Bulletin 3100.*

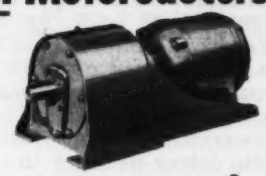
THE FALK CORPORATION, MILWAUKEE 1, WIS.

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in most principal cities

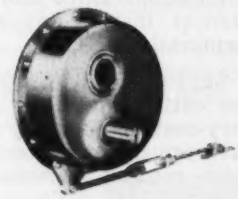
FALK

. . . a good name in industry



THE FALK ALL-MOTOR® MOTOREDUCER
the original All-Motor unit

(Shown) Horizontal concentric model. Also available in right angle and vertical types.



THE ALL-STEEL FALK® SHAFT MOUNTED DRIVE

Proved best for the countless industrial applications where a reducing unit mounting directly on shaft of the driven machine is indicated.

Units from 1/2 to 50 hp. Ratios —4:1, 14:1 or 24:1. Torque capacity up to 41,000 lb-in (in standard units). Prompt shipment from stock. For details, ask for *Bulletin 7100.*

Problem:

To reduce the cost of marketing polystyrene pellets

Solution:

SPROUT-WALDRON

PNEUMATIC BULK TRUCK

A recent announcement by officials of Cosden Petroleum Corporation tells of a new delivery concept, called, "Curb-Service Marketing." The revolutionary marketing plan involves the delivery of polystyrene pellets by special highway transports.

Key to the new concept is a group of five 28 ft. pneumatic aluminum bulk trailer units designed and built by Sprout-Waldron. Each of these trailers has a capacity of 1182 cu. ft., equivalent to 34,000 pounds of polystyrene pellets. The high powered unloading system permits driver delivery to the customer at the rate of 30 tons per hr. Delivery and storage in bulk cuts down on fringe expenses, such as unloading, warehousing, multiple handling and contamination. Bulk storage also permits instant inventory determination.

Sprout-Waldron bulk trucks are cutting handling and delivery costs in a variety of chemical applications. For more details, request Bulletin 205-A.

CW/104

SPROUT-WALDRON
Muncy, Pennsylvania

Size Reduction • Size Classification • Mixing
Bulk Materials Handling • Pelleting

Check 4168 opposite last page.

Waste squeeze play led by hydraulic packer unit

Uses: Packing waste, trash and refuse.

Features: Trailer compacts waste material to fraction of former volume.

Description: Packing mechanism of hydraulic compaction

Compacting operation of trailers is completely hydraulic

trailer is controlled by one-double acting lever. It moves with thrust of 65,000 lb. It is powered by a single telescopic cylinder on support platform.

Packer head moves complete length of body (300") for tighter packing, as well as clean discharge when dumping. An 18-gal sump at front of trailer gathers liquids when wet refuse is compacted.

Models are available in two sizes—DB-42 has capacity of 160 cu yd of loose refuse, is 34' 7" long and 10' 8" high; DB-53 holds roughly 210 cu yd of loose refuse, is 12' 6" high and 34' 7" long.

(Compaction trailers DB-42 and DB-53 are products of Dempster Brothers, Knoxville, Tennessee.)

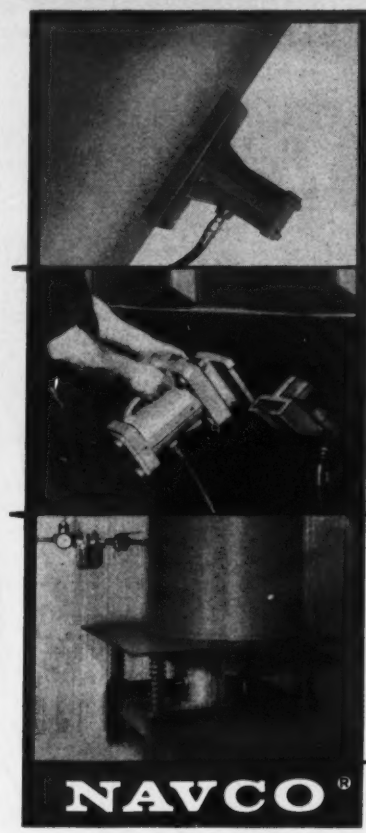
Check 4169 opposite last page.

Pumps are leakproof at heads to 600'

Uses: Canned-pumping applications.

Features: Pumps are designed for leakproof pumping at heads to 600'.

Description: Two-stage canned pumps incorporate rotor, shaft and impellers forming single rotating assembly. Both rotor and stator are completely enclosed within corrosion-resistant non-mag-



MOVE MATERIALS
THRU BINS • HOPPERS • CHUTES
with "maintenance-free" Navco One-Piece Vibrators*

Navco Air Vibrators have a patented one-piece design for trouble-free operation. No need to stock spare parts—no assembly bolts, housing springs, separate striking plates, or grooved pistons in Navco Vibrators. For bins, hoppers, chutes, concrete forms, and batching.

CUT UNLOADING TIME
on Covered R. R. Hopper Cars

Navco "Maintenance-Free" One-Piece HCP Air Vibrators* have long piston stroke for maximum amplitude and thrust—eliminate car "clean-out" of potash, cement, and other bulk materials. Piston is the only moving part. "Free-ride" design gives continual effective vibration action. Hydraulic clamp assembly available for car not equipped with brackets.

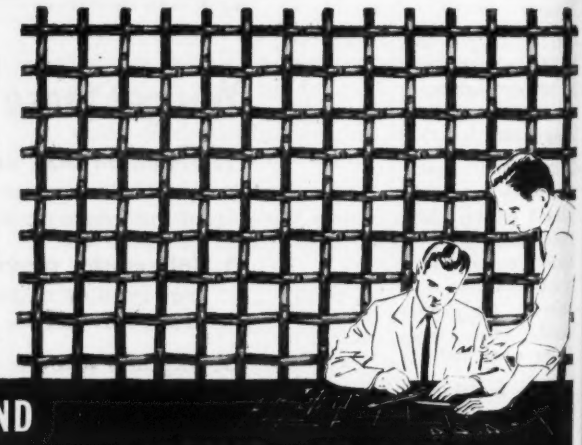
VIBRATOR TABLES
for Settling, Packaging, Scaling, Testing

Operator controls vibration frequency by changing the air pressure—gets required vibration for settling, packaging, shock or fatigue testing, or scale removal on castings. Complete with automatic lubricator, pressure regulator w/gage and knee, foot, or hand lever valve.

*Patented — Write Dept. CP-3 for catalog specifying vibrator application

NATIONAL AIR VIBRATOR CO.
433 Literary Rd. • Cleveland 13, Ohio

Check 4170 opposite last page.



Filtration • Straining • Screening • Catalysts

CLEVELAND
Has the Answer to All Wire Cloth Problems

● Whether your problem is bulk or fabricated parts, filtering, straining, screening or catalyst, get in touch with Cleveland. Over 40 years experience in the weaving and fabrication of industrial wire cloth provides the answers to your screen problems.

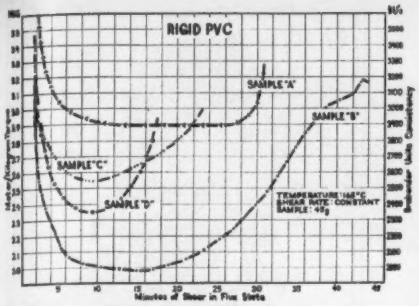
Immediate shipment of many standard meshes or weaves from stock. Fabrication into products is our engineering specialty.

SEE OUR AD IN CEC

Send your specifications or call today. We'll be glad to consult with you on your wire cloth problems without delay. Ask for Bulletin No. 10.

THE CLEVELAND WIRE CLOTH & MFG. CO.
3577 EAST 78th STREET, CLEVELAND 5, OHIO • DI 1-1933

Check 3962 opposite last page.



Accurately forecasts processability, saving time consuming plant experimentation, high scrap costs, down time, etc. Records plastic flow of all polymers at temperatures to 600°F, and measures as no other flow tester can under typical processing conditions . . .

- Molding and Extrusion Performance
- Polymer Stability
- Polymer Melt Flow at Various Shears
- Effect of Each Additive
- Conditions for Color Matching
- Decomposition Factors
- Temperature-Viscosity Relationship
- Average Molecular Weight

SEE FOR YOURSELF! Bring or send us your samples for free testing. Write for technical application bulletins.

PROCESSING PROBLEMS SOLVED . . .

before production begins with the stepless, variable shear rate PLASTOGRAPH by C. W. BRABENDER

Various measuring heads for all types of material

C.W. Brabender Instruments, Inc.
SOUTH HACKENSACK, N. J.
55 E. Wesley St., Diamond 3-8425

Check 4171 opposite last page.

Life and limb are at stake . . .

CHOOSE THIS *BETTER* Emergency Light

CARPENTER WATCHMASTERS

★ BETTER PROTECTION . . . every component of every unit is specially engineered for emergency lighting . . . for reliability

★ BETTER PERFORMANCE . . . each part must rate far in excess of even maximum requirements . . . for dependability

★ BETTER VALUE . . . built for longer life and less maintenance . . . for lowest cost over the years

THERE IS A CARPENTER WATCHMASTER MODEL FOR EVERY NEED (INCLUDING HAZARDOUS EXPOSURES) AND FOR EVERY BUDGET

CATALOG and TECHNICAL SPECS available for the asking. Write for special Watchmaster material now.

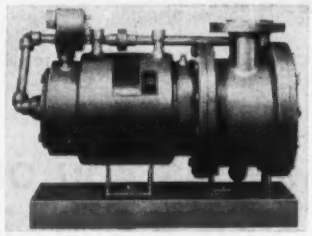
CARPENTER MFG. COMPANY
653 Bradley St.
Somerville 45, Mass.

Check 4172 opposite last page.

netic alloy cylinders.

Pumped fluid is allowed to circulate through motor section, thus serving to cool motor and lubricate bearings. No external lubrication is required.

Units for operation under 400°F are equipped with water jackets around stator for cooling (if required). High-temperature models for handling fluids over 400°F are equipped with external heat exchangers. Pumps are available for temperatures to 850°F and system pressures to 3500 psi. They can be modified for vacuum or slurry service.



Two-stage canned pumps are available for temperatures to 850°F and system pressures to 3500 psi

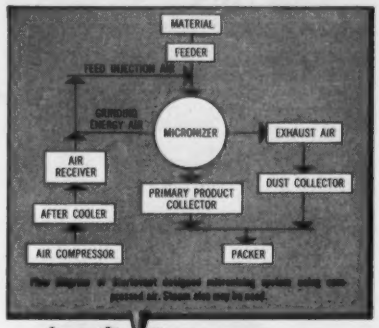
(Chempumps Series D are product of Chempump Division, Fostoria Corporation, Box 35-1, Huntingdon Valley, Pennsylvania.)

Check 4173 opposite last page.

"Be on the alert for an attempt to influence us!"

Need ½ to 44 Microns?

Sturtevant Micronizers* Make 325 Mesh Obsolete



One Operation Reduces, Classifies

Sturtevant Micronizers grind and classify in one operation in a single chamber—provide fines in range from ½ to 44 microns to meet today's increased product fineness needs. Can handle heat-sensitive materials.

Production Model (15 in. chamber)

No Attritional Heat

Particles in high speed rotation, propelled by compressed air entering shallow chamber at angles to periphery, grind each other by violent impact. Design gives instant accessibility, easy cleaning. No moving parts.

Classifying is Simultaneous

Centrifugal force keeps oversize material in grinding zone, cyclone action in central section of chamber classifies and collects fines for bagging. Rate of feed and pressure control particle size.

Eight Models Available

Grinding chambers range from 2 in. diameter laboratory size (½ to 1 lb. per hr. capacity) to large 36 in. diameter production size (500 to 4000 lbs. per hr. capacity). For full description, request Bulletin No. 091.

Engineered for Special Needs

A 30 in. Sturtevant Micronizer is reducing titanium dioxide to under 1 micron at feed rate of 2250 lbs. per hr. For another firm, a 24 in. model grinds 50% DDT to 3.5 average microns at a solid feed rate of 1200-1400 lbs. per hr. A pharmaceutical house uses an 8 in. model to produce procaine-penicillin fines in the 5 to 20 micron range. Iron oxide pigment is being reduced by a 30 in. Micronizer to 2 to 3 average microns.

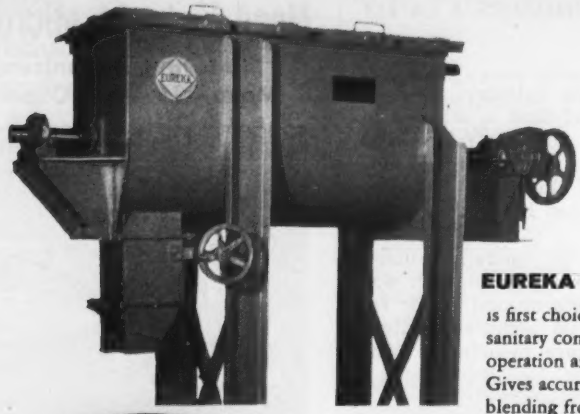
Sturtevant will help you plan a Fluid-Jet system for your ultra-fine grinding and classifying requirements. Write today.

Can Test or Contract Micronizing Help You?

Test micronizing of your own material, or production micronizing on contract basis, are part of Sturtevant service. See for yourself the improvement ultra-fine grinding can contribute to your product. Write for full details. STURTEVANT MILL CO., 119 Clayton St., Boston, Mass.

*REGISTERED TRADEMARK OF STURTEVANT MILL CO.

Check 4174 opposite last page.



EUREKA SANIMIX

is first choice where sanitary construction and operation are essential. Gives accurate, uniform blending from light-dry to heavy-dense materials. Wide choice of models and capacities.

EUREKA keeps you one step ahead in **PROCESSING EQUIPMENT**

TURNING IDEAS into products...in a hurry...is one big reason why Eureka can meet the needs of the fast-moving process industries. Chances are the equipment best suited to your operations is *already* part of the complete Eureka line.

WHEN A NEW PROCESS poses a problem, Eureka can design and build the equipment required to do the job. Try us and see!

OTHER EUREKA EQUIPMENT Includes units for

WRITE FOR CATALOG giving full information on Eureka process equipment.

S. HOWES CO., INC.

SILVER CREEK, NEW YORK • YEllowstone 42611

Since 1856 making good equipment ***better!***

Check 4175 opposite last page.

Tracking is tripped-up by sprayed insulation

Uses: Insulation and insulation-coating applications on electrical equipment.

Features: Insulation can be painted or sprayed on. Material reportedly gives standard insulating materials as much as 300 times more resistance to break-down by electrical arcing or tracking.

Description: Epoxy resin material is said to offer combination of electrical properties approaching those previously available only in ceramic materials. Coating may be applied to either new or existing equipment.

Coating is supplied as two solutions. Once mixed, it will last approximately 12 hours at room temperature, and longer if thinned or refrigerated.

Arc and track resistance of Limitrak coating is summarized in the following table:

Resistance Test	Limitrak	Paper-phenolic Laminate
High power arc, shots	6-12 (erodes)	2
Alabama power track, shots	10+	1
Circular track, in	No track	11.7+
Linear track, in	No track	3.5+
Dust and fog track, hr	50+ (erodes)	1.9 (tracks)
ASTM arc, sec	126	72

(Limitrak insulation is product of Component Products Dept., East Pittsburgh Div., Westinghouse Electric Corporation, 3 Gateway Center, Pittsburgh 30, Pa.)

Check 4176 opposite last page.

Dew point drops to −75°F in 30 minutes

Uses: Provision of dry environment for handling organic or radioactive chemicals and modern metals that cannot tolerate humidity.

Features: Freon-tight main chamber and oil-free gas-drying system permit dew point to be brought down to −75°F in 30 minutes, or variations thereof.

Description: Stainless-steel

A Message to Executives Seeking a New Plant Site

Check these 3 Important Plant Location Advantages in

PENNSYLVANIA

100% financing for your new plant

Complete financing on lease-purchase plan—low interest rate—deferred amortization. Plant "shells" now being readied for completion. Inspection welcomed.

Improved "tax climate"

No capital stock and franchise taxes—no machinery and equipment taxes—no stock transfer tax—no state personal income tax—reduced manufacturer's sales tax.

Plant location services

Staff specialists available to serve industry, engineering firms, management consultants, industrial realtors and others with fully detailed plant location data.

For free copy of pamphlets on these Pennsylvania Plant Location Advantages, write or call:

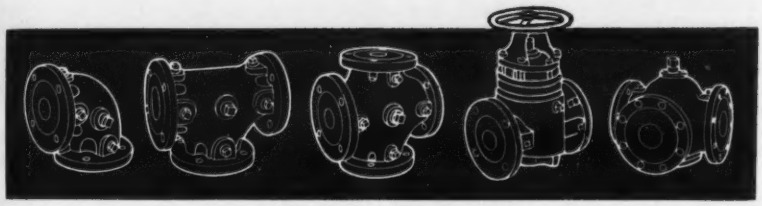
PENNSYLVANIA DEPARTMENT OF COMMERCE
South Office Building
707 State Street, Harrisburg, Pa.
Phone: CEdar 4-2912

Check 4177 opposite last page.

H&B JACKETED PIPE and FITTINGS

● The above cutaway illustrates H & B standard jacketed welded pipe and fitting construction, designed to allow complete jacketing of the product pipe. Special jigs and fixtures enable H & B to insure complete uniformity of the jacket area in relation to the O D of the product line and the I D of the jacket pipe. All H & B jacketed equipment is hydrostatically tested at 450 to 500 p.s.i. H & B welded steel jacketed fittings are ideally suited for process piping of pressures reaching 300 p.s.i. and temperatures up to 750°F. . . . A few of these fittings and valves are illustrated below. For more information send for bulletin J-57.

HETHERINGTON & BERNER INC. • 715 KENTUCKY AVE., INDIANAPOLIS 7, IND.



Check 4178 opposite last page.

GRIND BETTER BY IMPACT

For closely controlled particle size reduction, minimum temperature rise, high abrasion resistance and low horsepower requirements with no grinding tolerances to maintain.

RECENT APPLICATION

Grinding raw glass scrap to 95% minus 16 mesh. Entoleter® Impact Mill with wear resistant impactors for economical tonnage processing of this extremely abrasive material.

Free test runs on your material.

- Vibrating Screens
- Centrifugal Impact Mills and Mixers

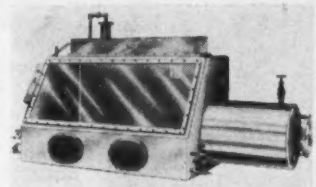
Send for complete literature.

ENTOLETER
DIVISION OF SAFETY INDUSTRIES, INC.
P. O. Box 924, New Haven, Conn.

Check 4179 opposite last page.

glove box incorporates vacuum-tight autoclave-type airlock. This contains two valves for admitting and evacuating inert gas and a one-inch vacuum-pump-out connection for evacuating air. With mechanical pump, the airlock can be pumped down to about 50 microns with leak rate not exceeding ½ micron/min.

Safety glass, ¼" thick, runs across sloping front of enclosure. Three services with gas-tight control valves are located both on inside and outside on each end of unit. Enclosure is available in 4, 5, 6 and 8' lengths. Gas-drying system is available top-mounted, side-mounted or bottom-mounted to meet space requirements.



With mechanical pump, air lock of glove box can be pumped down to approximately 50 microns, with leak rate not exceeding ½ micron/min

(Glove box A-13 is product of S. Blickman, Inc., 8400 Gregory Ave., Weehawken, New Jersey.)

Check 4180 opposite last page.

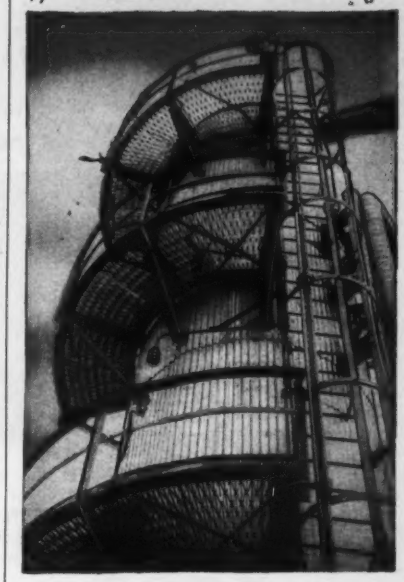
WANTED:

To Keep You Alive

Almost everyone knows of some tricky unexpected danger situation in his plant. CHEMICAL PROCESSING feels that the dissemination of such information to readers is important. Therefore a monthly series on Chemical Boobytraps is now appearing in this section. (See page 166) If you know of any such situation, please forward an account of it to:

Safety Editor
CHEMICAL PROCESSING
111 E. Delaware Place
Chicago 11, Illinois

RAIN OR SNOW CAN MAKE CATWALKS DANGEROUS



Walkways, catwalks and treads made of solid wood, metal or other material can collect snow, rainfall, grease or oil and become dangerously slippery.

But these walking surfaces, made of an open mesh of metal bars on edge, cannot collect these substances, leaving the surface always *clean*, dry and tractional for safer access to high places.

As founders of the grating industry, the Irving Company can draw upon over half a century of experience to supply you with quality grating products for catwalks, treads and other practical and economical uses.

"A FITTING GRATING FOR EVERY PURPOSE"

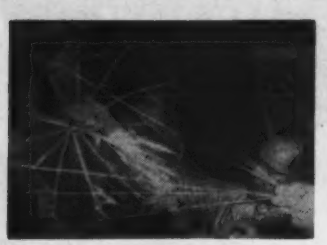
Write for our General Grating Catalog.

IRVICO

IRVING SUBWAY GRATING CO., Inc.
Originators of the Grating Industry

Offices and Plants at
5050 27th St., LONG ISLAND CITY 1, N. Y.
1850 10th St., OAKLAND 23, CALIFORNIA

Check 4181 opposite last page.



Plastic fabric-film

. . . gains strength through non-woven reinforcing grid of fibers that are allowed to move freely and gather-up to offer combined strength at tear or stress point. This type strength gives rip-stop safety factor.

Various end uses include types using polyethylene, Mylar, polyvinyl chloride and polyvinyl fluoride.

(Plastic fabric films are product of Griffolyn Co., Inc., 5276 E. Beltline, Madison, Wis.)

Check 4182 opposite last page.

NEW LITERATURE

Plant Engineering

Maintenance & Safety

Seals, of bonded metal-to-rubber type for quasi-static sealing where axial movement is utilized to effect seal to plane or conical surfaces, are outlined in six-page brochure which includes applications, gives design information, shows various seal configurations and illustrates actual products using the seals. Permadized Seal Brochure—Stillman Rubber Company.

Check 4183 opposite last page.

Planetary and star gears are delineated in eight-page bulletin which includes cutaway drawings, construction details, capacity and selection curves, selection examples and tables of dimensions. Bul 2401—De Laval Steam Turbine Co.

Check 4184 opposite last page.

Fork-truck safety is subject of series of sixteen 11 x 17" posters suitable for display. Each poster, done in a cartoon style, is designed to emphasize one aspect of safe-driving practices. Fork-truck Safety Posters—Automatic Transportation Company, Division of The Yale & Towne Manufacturing Company.

Check 4185 opposite last page.

SARCO TOPICS

HOW TO SOLVE COMMON TRACER LINE PROBLEMS

How to cure water hammer with a steam trap that will operate in vertical position

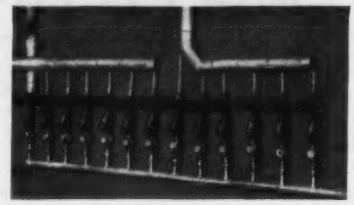
Water hammer is an inherent problem in long tracer lines. So is freezing. Both problems can be overcome, and here's an example of how it has been done. At the Socony Mobil Oil Company's Paulsboro, N.J., refinery, they found that the Sarco Thermo-Dynamic Steam Trap, type TD-50, not only withstands water hammer, but installing the trap in a vertical position —which permits free drainage—presents no problems at all, thanks to its unique thermodynamic principle. In fact, 90% of the 250 TD-50's at this plant are vertically mounted. They never block heat transfer, and they remove condensate and air as fast as they collect.

How to handle varied steam pressures — without adjustment

Can a trap — without adjustment — handle steam pressures that vary from 15 to 160 psi? Can the *same* trap vent air and drain condensate as rapidly as it is formed, be easy to install and require practically no maintenance at all? That was the problem set up by the engineering staff of Armour Chemical Division's McCook plant. They solved it by testing many traps. Their conclusion: Sarco TD-50 steam traps meet or beat their specifications, because:
they discharged condensate as fast as it formed, without wasting steam;
their compact inline construction made installation easy, even in tight quarters;
maintenance was practically negligible;
no adjustment was necessary for varying steam pressures. (In fact, the TD-50 is self-adjusting through its full operating range of 10-600 psi.)

No other steam trap can so adequately solve all these problems at one time.

How to be certain process fluid stays above 280° F. when outside temperature drops to —10° F.



The problem of maintaining design temperatures on tracer lines need not be difficult, no matter how extreme the conditions seem to be. For example, the tracer lines in a phthalic anhydride process at Witco Chemical Company's new Chicago plant had to be maintained above 280° F. Below this temperature, the chemical sets and the whole system would have to be taken apart and re-assembled. That's not all; ambient temperatures sometimes could drop to —10° F.

With reliability as a prime consideration, Scientific Design Company, Inc., who designed and constructed this brand new plant, selected the TD-50.

Because the TD-50 can be mounted vertically, freezing was no problem either. Added benefits that matter on tracer lines: the TD-50 is compact, light in weight, easy to install.

What is the most reliable tracer line trapping method to prevent unscheduled shutdown?

Particularly in refineries, steam traps have to function under exactly the kind of conditions that you'd expect to cause failure—they must function equally satisfactorily on low pressure or exhaust steam and on up through high-pressure, high temperature ranges. Not only that, but outside temperature may vary from subzero to subtropical. If maintaining design temperatures in your tracer lines appears to be hampered by these problems, consider how Phillips Petroleum Company, Kansas City, solved them. They found a trap which drains their tracer lines automatically over a full range of pressure, temperatures and loads. It's the Sarco TD-50 Steam Trap.

With only one moving part—a stainless steel disc, the TD-50 has little that can go wrong. In fact, it's so free of trouble that Phillips Petroleum Company consider their TD-50's as reliable and efficient as the piping. They now rely on 1800 of them throughout the plant. 1408

FOR FULL INFORMATION ON TRACER LINE TRAPPING or on any steam trapping problem—see your Sarco Sales Representative or write to

SARCO COMPANY, INC.
635 Madison Avenue,
New York 22, N. Y.
Plant: Bethlehem, Pa.

STEAM TRAPS • TEMPERATURE CONTROLLERS • STRAINERS • HEATING SPECIALTIES

SARCO

Here are 7 Sound Reasons Why the Thermo-Dynamic® Does a Better Job of Trapping

1. *Simplicity*—has only one moving part. 2. *Maintenance*—practically zero. 3. *Wide pressure range*—one trap for all pressures from 10 to 600 psi. 4. *Uniform performance*—operates equally well on heavy, light, or no condensate load. 5. *Operates against back pressures*—up to 50% of inlet pressure. 6. *Rugged*—unaffected by superheat, water hammer, vibration, or corrosive condensate. 7. *Minimizes inventory* of spare parts.

Maintenance Time: 40 Seconds. If it now takes your maintenance crew more than a couple of minutes to service an ordinary trap, you're throwing away valuable time. This Sarco Thermo-Dynamic can be cleaned, blown out if necessary, and reassembled on the line in as little as 40 seconds.

For Prompt Information on the TD-50 . . . or for fast help on the efficient solution of any steam trapping problems, get in touch with a SARCO District Office, Sales Representative, or Distributor. (There's one near you.)

Only SARCO makes all 5 types:

Thermo-Dynamic* • Thermostatic • Liquid Expansion • Float Thermostatic • Inverted Bucket

*U.S. Pat. No. 2,817,353 TM Reg. U.S. Pat. Off. 1409

SARCO COMPANY, INC.
635 Madison Ave., New York 22, N. Y.

Check 4186 opposite last page.

ENGINEERING & SAFETY

Thermal element of snap-acting disc type, is covered in 29-page booklet, "The Story of the Spencer Disc" — Metals & Controls, Division of Texas Instruments, Incorporated.

Check 4187 opposite last page.

High-temperature seals, applicable for sealing fractionating trays in all types of process equipment to 900°F, are presented in four-page bulletin SM-27-59—Metal Textile Corporation, Division of General Cable Corporation.

Check 4188 opposite last page.

Safe handling of metallic sodium on a plant scale is considered in a brochure which incorporates information on metallic sodium and its uses, sodium-handling equipment, procedures for handling sodium in the plant and general safety and first-aid measures. "Handling Metallic Sodium . . ."—U. S. Industrial Chemicals Co.

Check 4189 opposite last page.

Maintenance-equipment care, for both mechanical (SD-598) and hand (SD-597) items is discussed in detail in the data sheets, Buls SD-597 and SD-598—Puritan Chemical Company.

Check 4190 opposite last page.

Rubber-seat butterfly valve is presented in 56-page catalog, incorporating specifications, dimension drawings, water-flow data, gas-flow data, weights and freight rates, and prices. Bul 10AM—Henry Pratt Company, Incorporated.

Check 4191 opposite last page.

Steam traps and condensate drainage are reviewed in a booklet which gives fundamental facts on condensate drainage and all types of steam traps. "Primer"—Barnes & Jones, Inc.

Check 4192 opposite last page.

Filtration-plant valves, of filter-drain, backwash and rewash types are presented in eight-page bulletin which includes installation-arrangement drawings. Bul W-18—Golden-Anderson Valve Specialty Company.

Check 4193 opposite last page.

Safe practices for unloading liquid phenol from tank cars are detailed in 10-page publication, which lists authorized tank cars in common use for transportation of this toxic combustible chemical (listed by ICC as Class B poison). Manual Sheet TC-6 — is available at 30¢ per copy from the Manufacturing Chemists' Association Incorporated, 1825 Connecticut Ave., NW, Washington 25, D.C.

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Check 4195 opposite last page.

ENGINEERING & SAFETY

Chemical-engineering faculties are conveniently enumerated in 56-page directory which lists wide variety of information concerning Departments of Chemical Engineering in United States and Canada. This includes whether departments are accredited or not, types of graduate work offered, degrees offered in 1958-1959, names and degrees of departmental faculty and names of placement officers. "Chemical Engineering Faculties —1959-1960"—Chemical Engineering Education Projects Committee, Office of the Executive Secretary, American Institute of Chemical Engineers.

Check 4196 opposite last page.

Welding-rod and electrode comparison charts are included in 48-page booklet, which permits at-a-glance classification of filler metal, irrespective of brand name or number. Copies may be obtained at $2.50 each from Dept. T, American Welding Society, 33 W. 39th St., New York 18, N. Y.

Mechanical differentials are treated in 24-page booklet which describes differentials, how they work and typical applications, among other things. "Mechanical Differentials" —PIC Design Corp., Subsidiary of Benrus Watch Company, Inc.

Check 4197 opposite last page.

Sealless pumps are covered in four-page bulletin which discusses design, operation and selection of proper canned pumps. Bul 1100—Chempump Div., Fostoria Corp.

Check 4198 opposite last page.

Spray lubricant for open gears is specified in single-sheet Open-gear Spray Lubricant Bul—J. F. Withers Co.

Check 4199 opposite last page.

Safety of a worker's fingers is subject of eight-page pamphlet, "A Simple Do-It-Yourself Project"—National Safety Council.

Check 4200 opposite last page.

Air conditioning and refrigeration are considered in 36-page booklet which incorporates, in addition to descriptions of air-conditioning and refrigeration equipment, information on principles of refrigeration, refrigeration tables and variety of application information. Bul 80-F—Frick Company.

Check 4201 opposite last page.

Sanitizers and disinfectants are subject of recent technical paper, "New Developments in Sanitizers and Disinfectants" — Onyx Oil & Chemical Co.

Check 4202 opposite last page.

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CHR's pressure-sensitive, TEFLON* tape with fluoropolymer adhesive.

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Check 4203 opposite last page.

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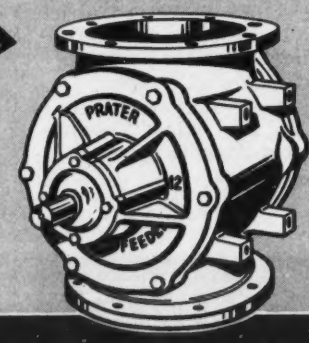

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Check 4204 opposite last page.

manufacturers' current literature

This section features a variety of literature currently available from manufacturers. See also the other sections in this issue for new literature pertaining to those particular sections

Corrosion Control

Chemical pumps which can pump up to 812 gph and maximum pressure of 10,000 psi with metering accuracy of ± 1%, receive full treatment in Series 200 Pump Bul — Pump Division, American Meter Company.

Check 4205 opposite last page.

Protective coatings, including vinyl-based and formulations based on epoxy resins, for practical applications of specialized protection against wide range of specific corrosives and exposure conditions are given full treatment in Tygon Data Book — Plastics and Synthetics Division, U.S. Stoneware.

Check 4206 opposite last page.

Square-braided packings in three styles fabricated of Teflon for highly corrosive surfaces are reviewed in Revised Bul CP-552 — Chemical & Power Products, Inc.

Check 4207 opposite last page.

Plastic tape which seals all types of pipe against chemicals, corrosives, hydraulic fluids, aromatic fuels, solvents, toxics and gases, is summarized in Thred-tape Data — Crane Packing Company.

Check 4208 opposite last page.

Pipe, fabricated of Pyrex and suitable for corrosive situations except those involving handling of large quantities of hydrofluoric or glacial phosphoric acid, or hot alkalies, is presented in PE-3 Bul — Corning Glass Works.

Check 4209 opposite last page.

Valves, including butterfly, slide, gate, check, diaphragm and plastic, for corrosive and other difficult service are itemized in Bul 800C — W. S. Rockwell Company.

Check 4210 opposite last page.

Valves, available with Teflon-coated plugs for use where infrequent or inadequate plug valve lubrication might be expected, and in other corrosion-resistant coatings, are covered in Rockwell-Nordstrom Bul — Rockwell Manufacturing Co.

Check 4211 opposite last page.

Metering pumps designed for variety of applications involving handling of difficult fluids at accurately controlled volume is described in Bul 59 — Process Equipment Division, Lapp Insulator Co., Inc.

Check 4212 opposite last page.

Steel pipe, lined with form of Teflon for handling corrosive liquids, is detailed in Fluoroflex-lined Pipe Data — Resistoflex Corp.

Check 4213 opposite last page.

Centrifugal pumps that feature convenient accessibility to impeller and interior and are capable of handling a wide range of corrosive liquids are subject of literature. Pumps are available in 10 sizes, capacities to 720 gpm, heads to 280 ft, and are operable with temperatures to 350°F. Bul 725.4 — Goulds Pumps, Inc.

Check 4214 opposite last page.

Pipe fittings, available in complete selection of metals, are described in Speedline Cat—Horace T. Potts Company.

Check 4215 opposite last page.

Pipe which has ⅛" thick glass lining and which can be "field cut" is described in detail in bulletin. Rated at 150 psi and available in 1½, 2 and 3" diameters, pipe can be used with all acids (except HF) to 350°F, and with all mild alkalies at moderate temperatures. Bul 989 — Pfaudler Permutit, Inc.

Check 4216 opposite last page.

Acid discharge hose, fabricated of abrasion- and acid-resistant rubber for the cover and pure gum for tube, are described in A-H Hose Data — Acme Hamilton Manufacturing Corporation.

Check 4217 opposite last page.

Metering pumps for handling of dangerous or corrosive chemicals are reviewed from the standpoint of applications in Bul 553-1 — Milton Roy Company.

Check 4218 opposite last page.

Linings which are compounded of rubber and neoprene to meet specific problems and custom-fitted, are considered in Rubberhide Lining Data — Goodall Rubber Co.

Check 4219 opposite last page.

Dry bearing materials — Teflon-based — which are impervious to practically all known chemicals, solvents or corrosives, are described in Bul T-120 — Crane Packing Company.

Check 4220 opposite last page.

Wire cloth, available in such metals as stainless steel, monel, nichrome, phosphor bronze, aluminum, brass and copper for corrosive service, is described in Bul F-C — Newark Wire Cloth Company.

Check 4221 opposite last page.

Pulverizers, powered by compressed air, gas or steam for grinding materials to micro-size powders, are presented in Jet Pulverizer Bul — The Jet Pulverizer Company.

Check 4222 opposite last page.

Gasketing, expansion joints, color-coated thin-walled tubing, and sheets of Teflon are covered in Teflon Data — Plastic Products Div., Raybestos-Manhattan, Inc.

Check 4223 opposite last page.

Heat Exchange and Heating

Convection-heated ovens, available in bench, cabinet, truck and conveyor types, are presented in Bul 127 — W. S. Rockwell Co.

Check 4224 opposite last page.

Electric heaters and heating elements, available in more than 15,000 types, sizes and ratings, are itemized in Cat 60 — Edwin L. Wiegand Company.

Check 4225 opposite last page.

Heat Exchangers, that are custom built for specific situations, are subject of Heat Exchanger Data — Schutte and Koerting Co.

Check 4226 opposite last page.

Heat exchanger equipment, with particular reference to design and fabrication, is subject of Heat Exchanger Data—Manning & Lewis Engineering Company.

Check 4227 opposite last page.

Submerged combustion units which are available with heat inputs from 250,000 to 60,000,000 Btu/hr and may be fired by gas, distillate oil or dual fuel, are reviewed in Bul 115 — Thermal Research & Engineering Corp.

Check 4228 opposite last page.

Heat exchangers receive full treatment in 120-page manual. Illustrated and described are components of shell and tube heat exchangers commonly used in processing, complete system of interchangeable front heads, shell and rear heads, fundamentals of heat transfer and design. Heat Exchanger Manual — Heat Exchanger Division, Patterson-Kelley.

Check 4229 opposite last page.

Scraped surface exchangers which feature a rotating action that continuously sweeps surfaces clean even while processing highly adhesive materials, are detailed in Exchanger Literature — Henry Vogt Machine Co.

Check 4230 opposite last page.

Valves

Valves, both globe and angle designed for applications involving service temperatures from 0 to 160°F and pressures to 400 psig WOG, are cataloged in Cat L-475 — The Bastian-Blessing Company.

Check 4231 opposite last page.

Valves, featuring positive closure and non-lubrication, for use with pressure regulators, meters, reflux pumps, compressors and similar equipment in areas where repairs must be carried out intermittently, are discussed in Cat 58-B — Orbit Valve Company.

Check 4232 opposite last page.

Valves, both iron gate and stainless steel globe, and pipe joints are covered in Bul AD-2411—Crane Company.

Check 4233 opposite last page.

Ball valves, available with interchangeable seats and seals, plus accessories to fit remote control requirements, are discussed in "At Your Service" Data—Jamesbury Corporation.

Check 4234 opposite last page.

Angle valves, offering advantages of single-piece forged body and bonnet flange, simplified OS&Y bonnet and reciprocating stem are subject of 74 Valve Bul — Jerguson Gage & Valve Company.

Check 4235 opposite last page.

Stainless steel valves are given detailed coverage in Aloyco Valve Bul — Alloy Steel Products Company.

Check 4236 opposite last page.

Drain valves which are designed so that in closed position the piston extends up into tank thus preventing possibility of outlet becoming plugged, are detailed in Drain Valves Cat—Strahman Valves, Inc.

Check 4237 opposite last page.

Ball valves which have fixed ball and floating seat are subject of Flo-Ball Data — Hydromatics, Inc.

Check 4238 opposite last page.

Valves which feature interchangeability are subject of three technical bulletins. Described in detail are pressure-regulating valves, split-body valves, and standard diaphragm-operated control valves, respectively, in Buls 401, 132, and CYS-3 — Kieley & Mueller, Incorporated.

Check 4239 opposite last page.

Processing Equipment

Drying equipment is topic of 12-page bulletin, which includes information on vacuum-chamber, rotary-vacuum, conical-vacuum and drum dryers, along with descriptions of flakers, freeze dryers, pan dryers, hot-water-circulating systems, vacuum pumps and surface condensers. Bulletin incorporates specification tables and photographs. Drying Equipment Bul —J. P. Devine Mfg. Co.

Check 4240 opposite last page.

Process-equipment line is illustrated in 48-page catalog which includes a number of schematic drawings. Of particular interest is the section on heat exchangers which includes detailed discussion of heat-transfer coefficients and pressure drops. Cat 60—Acme Process Equipment Company.

Check 4241 opposite last page.

Spray dryers, featuring centrifugal atomizing techniques and suited for automatically-controlled, high-tonnage production conditions, are reviewed in Bul 51—Bowen Engineering, Inc.

Check 4242 opposite last page.

Portable disperser which dissolves, disperses, and deagglomerates is subject of Portable Disperser Data—Specialty Machinery Corporation.

Check 4243 opposite last page.

Mist eliminators and entrainment separators for distillation equipment, vacuum towers, knockout drums, separator vessels and wide range of other applications are expanded upon in Tech Reprint 591 and Bul 21 — Otto H. York Co., Inc.

Check 4244 opposite last page.

Vacuum dryers which also can be used as cone blenders are subject of Vacuum Dryer Bul—Paul O. Abbe Inc.

Check 4245 opposite last page.

Pelletizer which produces pellets from ⅛ to 1″ diameter in length to 2 or more, is featured in Bul L-109 — Industrial Division, Daffin Manufacturing Company.

Check 4246 opposite last page.

Magnetic pulleys, available in two models—one for removing large pieces of tramp iron from heavy depths of flow and the other for fine iron separation—are discussed in Magnetic Pulley Data—Eriez Manufacturing Company.

Check 4247 opposite last page.

Fluid mixers, available in ratings ranging from 10 to 150 hp and 15 standard interchangeable speeds, are subject of Lightnin Mixer Data — Mixing Equipment Company, Inc.

Check 4248 opposite last page.

Stainless steel reactor, available with dimpled jackets permitting operation at temperatures as high as 600°F and jacket pressures to 150 psi, is described in Bul 944—Pfaudler Permutit, Inc.

Check 4249 opposite last page.

Mulling techniques, including discussion of how controlled dispersion can be easily achieved, receives full treatment in Mulling Handbook — Simpson Mix-Muller Division, National Engineering Company.

Check 4250 opposite last page.

Rotary blenders which start four-way blending while charging, continue during discharge, and perform up to six complete cycles per hour are explained in Bul 080B — Sturtevant Mill Co.

Check 4251 opposite last page.

Aeration ejectors which provide 20 to 25% oxygen absorption are covered in Aeration Ejectors Bul —Penberthy Manufacturing Company, division of Buffalo-Eclipse Corporation.

Check 4252 opposite last page.

Grate magnets which are non-electric, self-contained, and designed to prevent choking possibilities caused by bridging of iron and material accumulation, are described in Grate Magnets Data—Eriez Manufacturing Company.

Check 4253 opposite last page.

Batch mixers for propellants, plastisols or other heavy paste materials, available in sizes from 1 to 150 gal, are specified in Mixers Bul — Chas. Ross & Son Co., Inc.

Check 4254 opposite last page.

Processing equipment, featuring flexibility for unusual problems, and including drum flakers and dryers, rotary and conical dryers, vacuum shelf dryers, granulators, mills, and wide range of related equipment are covered in Processing Equipment Data—Processing Equipment Division, F. J. Stokes Corporation.

Check 4255 opposite last page.

Dispersators, ranging from laboratory to production models, are discussed in Buls 545, 546 and 547—Premier Mill Corporation.

Check 4256 opposite last page.

Screeners and coolers are subject of Screener-Cooler Data—The Orville Simpson Company.

Check 4257 opposite last page.

Surface condensers are subject of 16-page booklet. Sectional drawings and photographs supplement description of steam jet ejectors, duplex drainers and air leakage meter. Tables, curve and examples show how to check condenser performance. Bul C-10 — Elliott Company, Division of Carrier Corporation.

Check 4258 opposite last page.

Equipment leasing is considered from all aspects in 16-page booklet. Advantages of leasing and some equipment available are listed. TE1 Bul — Tishman Equipment Leasing Inc.

Check 4259 opposite last page.

Dryers, including conveyor, spray, tray and truck, are subject of Bul 443—Proctor & Schwartz, Inc.

Check 4260 opposite last page.

"This is the plant's nerve center."

Fluids Handling

Free-piston pumps which handle ceramic slip, abrasives, molten metals (up to 2000°F), acids, syrups, greases, medicines, sludge, mud, plastics, solids in suspension, and water, are subject of Free-piston Pump Data — The Crossley Machine Co.

Check 4261 opposite last page.

Storage vessels for low-temperature applications are subject of Low-temperature Apparatus Cat — Hofman Laboratories, Inc.

Check 4262 opposite last page.

Plastic packings which have lubricant ground in during manufacture and are available in five different types, are presented in Plastic Packings Data — Packing Division, Raybestos-Manhattan, Inc.

Check 4263 opposite last page.

Sealer for thread and flange joints provides tight seal under wide range of temperatures and pressures, but remains flexible indefinitely. Leak Lock Data—Highside Chemicals Incorporated.

Check 4264 opposite last page.

Sealing systems and floating roof tanks for storing products containing 75% aromatics and for a wide range of other difficult liquids are subject of Tubeseal Data — Hammond Iron Works.

Check 4265 opposite last page.

Packing ring sets for static and semi-static packing applications, and combinations for rotating equipment are given full treatment in Revised Bul CP-552—Chemical & Power Products, Inc.

Check 4266 opposite last page.

Steam traps and advice on how to match them to requirements is subject of Steam Trap Data — Sarco Company, Inc.

Check 4267 opposite last page.

Flexible connectors, available in stainless steel, bronze or monel, are detailed in Connectors Data — Allied Metal Hose Company.

Check 4268 opposite last page.

Steam traps, their selection and effect on maintenance costs are subject of Steam Trap Book — Armstrong Machine Works.

Check 4269 opposite last page.

Turbo pumps for general boiler heat or any other pumping service where medium volume and high pressure is required are covered in "IND" Pump Bul — Coffin Turbo Co., division of Food Machinery and Chemical Corporation.

Check 4270 opposite last page.

Chemical pumps in three basic designs—gear, rotary, and centrifugal—are available in variety of metals and non-metallics for every corrosion and contamination problem are covered in Eco Pump Data—Eco Engineering Company.

Check 4271 opposite last page.

Tube fittings which are quickly connected or disconnected by simple, straight-line, fingertip pull-or-push action, are subject of Swagelok Fitting Data — Crawford Fitting Company.

Check 4272 opposite last page.

Pipe fittings, machined from quality solid steel bars and adaptable to run-pipe sizes to 36", are featured in TeeLets Data — Forge and Fittings Division, H. K. Porter Company, Inc.

Check 4273 opposite last page.

Tracer line trapping and other steam trapping problems are explained in Tracer Line Trapping Data—Sarco Company, Inc.

Check 4274 opposite last page.

Steam traps that test for condensate in line ahead of trap and operate to discharge it as it forms, are subject of Steam Trapping Bul—Yarnall-Waring Company.

Check 4275 opposite last page.

Vacuum pumps — available in models up to 500 cfm displacement — are described in Microvac Pump Bul — Vacuum Equipment Division, F. J. Stokes Corporation.

Check 4276 opposite last page.

Piston packing, fabricated completely of nylon, is introduced in Bul 5903 — Darling Valve & Manufacturing Co.

Check 4277 opposite last page.

Water control equipment as used in $28 million dollar sewage treatment plant recently completed for Miami, Fla., is covered in Water Control Bul — Rodney Hunt Machine Co.

Check 4278 opposite last page.

Safety

Drench shower and emergency eye-wash combination for use in cases of accidental body contamination is subject of Model 8300 Bul—Haws Drinking Faucet Company.

Check 4279 opposite last page.

Manway which features simplified opening arrangement is introduced in Manway Bul—Lenape Hydraulic Pressing & Forging Co.

Check 4280 opposite last page.

Emergency lights for every need including hazardous exposures are discussed in Watchmaster Cat—Carpenter Manufacturing Company.

Check 4281 opposite last page.

Starter enclosures with "slide and hook" arrangement for easier installation is subject of literature. Enclosures are available in three ways—complete device, enclosure only, or components only. Bul 9990—Square D Company.

Check 4282 opposite last page.

Ventilators which are portable and adaptable to many "fresh-air" requirements in industry are described in Ventilators Data—Coppus Engineering Corporation.

Check 4283 opposite last page.

Portable fire extinguishers—both pressurized water and loaded stream—which do not require inverting, bumping or other procedures to operate, are introduced in Portable Extinguishers Data—Walter Kidde & Company, Inc.

Check 4284 opposite last page.

Coated fabric gloves are available in gauntlet, knit wrist, band top and safety cuff styles. Silvertex Glove Literature — The Surety Rubber Company.

Check 4285 opposite last page.

Chemical Materials

Chlorinated compounds, including hexachloroacetone, trichloroacetamide, trichloroacetdimethylamide, trichloroacetanilide, and trichloroacetonitrile, are subject of technical data. Specify compound on which data is sought on reader's service slip. General Chemical Division, Baker & Adamson.

Check 4286 opposite last page.

Tributyl phosphates' use as an antifoam agent is described along with complete specifications in Tributyl Phosphate Bul — Industrial Chemicals Department, Commercial Solvents Corporation.

Check 4287 opposite last page.

Nonionic surfactants, available in nine different forms, are subject of Tergitol Data—Union Carbide Chemicals Company, division of Union Carbide Corporation.

Check 4288 opposite last page.

Intermediates, including benzyl chloride, benzoyl chloride, paranitrobenzoyl chloride and metanitrobenzoyl chloride, are covered in technical literature. Specify intermediate on which data is desired on reader's service slip. Hooker Chemical Corporation.

Check 4289 opposite last page.

Sulfonate derivatives, including potassium acetaldehyde disulfonate, methane trisulfonic acid, sulfuryl fluoride, sulfur trioxide-pyridine complex and sulfur trioxide-trimethylamine complex, are covered in literature. Specify derivative on which data is desired on reader's service slip. General Chemical Division, Baker & Adamson.

Check 4290 opposite last page.

1,3-Butylene Glycol, a 4-carbon glycol with unusual stability, having applications for producers of textile lubricants, printing inks, dyes, cosmetics, toilet goods, elastomers, plasticizers and alkyd, polyurethane and polyester resins, is given comprehensive treatment in 1,3-Butylene Glycol Bul — Celanese Chemical Company, Division of Celanese Corporation of America.

Check 4291 opposite last page.

Thionyl chloride for use as chlorinating agent or to introduce sulfur or oxygen and sulfur is subject of Thionyl Chloride Data—Hooker Chemical Corporation.

Check 4292 opposite last page.

Fused quartz for ultra-violet applications, metallurgical investigations, chemical research, and other uses in research and product operation is subject of Vitreosil Tech Data — Thermal American Fused Quartz Co., Inc.

Check 4293 opposite last page.

Adipic acid in practically water-white solution which shows only slight discoloration after heating for two hours at 200°C is discussed in Adipic Acid Specs — National Aniline Division of Allied Chemical.

Check 4294 opposite last page.

"I think I may have hit upon something with this new shaving lotion."

Silicone defoamers for use in such applications as textile dyeing, papermaking and sizing, refining, distilling and gas "scrubbing," and paint formulating are explained in Defoamers Data—Dow Corning Corporation.

Check 4295 opposite last page.

Surface coating resins derived from styrene-butadiene copolymer of low selective weights (8000 to 10,000) and high unsaturation (iodine number approximately 300) are subject of bulletin. Discussed in detail with complete specifications is basic raw material plus two modifications. Tech Bul 12 — Market Development Division, Enjay Company, Inc.

Check 4296 opposite last page.

Nitrogen tetroxide, low-cost oxidant for use in wood pulping, rubber, metal recovery and lubricant purification industries, is subject of Nitrogen Tetroxide Data — Nitrogen Division, Allied Chemical.

Check 4297 opposite last page.

Oxalic acid derivatives, including oxanilide, ethyl oxanilate and oxalic esters, are described in technical literature. Specify derivative on which data is desired on reader's service slip. General Chemical Division, Baker & Adamson.

Check 4298 opposite last page.

Plasticizer which imparts flame retardance, improved resistance to water, oil, gasoline, high permanence on heating, and high tensile strength joined with flexibility, is covered in literature. A stabilized chlorinated ester of a fatty acid, details on plasticizer are covered in MPS-500 Data—Hooker Chemical Corporation.

Check 4299 opposite last page.

Phosgene derivatives, including benzophenone, benzophenone-4,4'-dicarboxylic acid, diphenyl carbonate, ditolylketone, di-o-tolyl carbonate, di-n-tolyl carbonate, di-m-tolyl carbonate, and di-p-tolyl carbonate. Specify on reader's service slip derivative on which data is desired. General Chemical Division, Baker & Adamson.

Check 4300 opposite last page.

Process Instrumentation

Analog computer which is pre-expanded to accept up to 80 operational amplifiers, and such accessories as product multiplier, transistorized plotting board and memory and storage analog computer, are summarized in MC-5800 Computer Bul — Computer Systems, Inc.

Check 4301 opposite last page.

Mercury-switch controls, for pressure, temperature, liquid-level and mechanical movement, are available with various case styles for indoor, outdoor or hazardous locations. These are delineated in 56-page Cat 860—The Mercoid Corp.

Check 4302 opposite last page.

Liquid level control systems designed around an actuating magnet and which can control level changes from .0025" to 150' are discussed in Liquid Level Control Cat — Magnetrol, Inc.

Check 4303 opposite last page.

Proportioning pumps which have repetitive metering accuracy of ± 1% when operating between 10 and 100% of capacity are discussed in literature. With capacities from .65 gph to 1624 gph, pumps feed precisely metered fluids or slurries in all ratios, with controlled process variables. Pumps Bul—Pump Division, American Meter Company.

Check 4304 opposite late page.

High-pressure gages for use in refineries and chemical plants are described in Gage Cat — Strahman Valves, Inc.

Check 4305 opposite last page.

Gages for measuring tank contents at any distance are subject of TankoMeter Bul — Uehling Instrument Company.

Check 4306 opposite last page.

Controllers for all types of processing requirements including auto-selector, cascade and ratio systems, and automatic batch control are detailed in Bul 13-18 — The Foxboro Company.

Check 4307 opposite last page.

Scale feeders and meters which can handle any free-flowing solid in batch or continuous blending operation . . . as little as 3 lbs per minute; as much as 3000, are covered in Feeder and Meter Data — Wallace & Tiernan Incorporated.

Check 4308 opposite last page.

Surface pyrometers for applications requiring close temperature tolerances and continuous accurate knowledge of temperature of working surfaces are summarized in Bul 194-SA — Cambridge Instrument Company, Inc.

Check 4309 opposite last page.

Valve operators which are electronically controlled and adaptable to plug, butterfly or standard gate valves in addition to conventional control valves, are featured in IPE Operators Data — Electronics Division, Industrial Process Engineers, Inc.

Check 4310 opposite last page.

Roof ventilators, designed to eliminate need for weather covers, are described in Bul 680—Propellair Division, Robbins & Myers, Inc.

Check 4311 opposite last page.

Pressure-sensitive tape designed for extreme temperatures (−100°F to 500°F) and fabricated of Teflon are described in Temp-R-tape Folder—Connecticut Hard Rubber.

Check 4312 opposite last page.

Thermocouple wires, available in over 1500 different types, are subject of Bul 32WS-R — Thermo Electric Co., Inc.

Check 4313 opposite last page.

Conveying

Pneumatic conveyors for moving dry bulk materials are described in Pneumatics Data—Fuller Company, subsidiary of General American Transportation Corporation.

Check 4314 opposite last page.

Carriers that have spun-end roller assembly and interchangeable parts for quick installation, are delineated in Bul 355 — Stephens-Adamson Mfg. Co.

Check 4315 opposite last page.

Pneumatic integrator for accurately weighing material passing over conveyor belts of manufacturer's continuous weigher is introduced in Buls 550.20A-1 and 550.20-1 — B-I-F Industries, Inc.

Check 4316 opposite last page.

Conveyor-elevators, utilizing series of U-type skeleton flights to move material readily around sprockets and bend corners and up inclines, is subject of Bul 358—Engineering Division, Stephens-Adamson Mfg. Co.

Check 4317 opposite last page.

Air-gravity conveyor which features smooth, rigid, porous plate affording thorough aeration of conveyed material, is discussed in Bul 58-K — Kennedy Van Saun Manufacturing & Engineering Corporation.

Check 4318 opposite last page.

Pneumatic conveyor systems for handling dry granular material in quantity are described in Bul P58-G — National Conveyors Company, Inc.

Check 4319 opposite last page.

Belt conveyors, available in standardized sectional components for organization into systems, are itemized in Cat 2779 — Link-Belt Company.

Check 4320 opposite last page.

Bulk handling and positive pressure system which is capable of unloading and conveying to storage, sizing incoming material, and transferring material at rates of 30,000 lb/hr, is described in Bul I-57 — Sprout-Waldron Company.

Check 4321 opposite last page.

Plant Engineering and Maintenance

Steam turbines offered in range from one to 250 hp and having totally enclosed governor, are detailed in Cat 200 — Coppus Engineering Corporation.

Check 4322 opposite last page.

Tee-head bolts manufactured in standard sizes ¼" and larger, and fabricated from all standard steels, stainless steels and non-ferrous metals, are described in Tee-head Bolts Data—Pawtucket Manufacturing Company.

Check 4323 opposite late page.

Gratings and treads designed for simplicity of construction, permanent strength and rigidity, minimum weight for specific load-carrying capacity, and maximum opening for light and ventilation, are presented in illustrated 24-page Bul 1110-5M — Dravo Corporation.

Check 4324 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Floor surfacing, a sheathing which may be trowelled onto corroded and eroded surfaces to protect them from subsequent corrosion or erosion, is given full treatment in Penntrowel Data — Corrosion Engineering Products Department, Pennsalt Chemicals Corporation.

Check 4325 opposite last page.

Graphite discs which are easily installed in re-usable carbon or aluminum holders and are available in sizes 1 to 8" with burst pressure ratings 1 to 400 psig, are discussed in Graphite Discs Data — Delanium Graphite Division, Kearney Industries.

Check 4326 opposite last page.

Pipe insulator, fabricated of polyurethane foam and capable of withstanding temperatures from −243° to +214°F, is subject of literature. Bul U200-1—Fibrous Products Division, Union Asbestos & Rubber Company.

Check 4327 opposite last page.

Wire cloth for filtration, straining, screening, and catalysts is detailed in Bul 10—The Cleveland Wire Cloth & Mfg. Co.

Check 4328 opposite last page.

Tubing cutters in two models, one handling ⅛ to 2⅜" OD and the other ⅛ to 1⅛" OD capacity, are described in Tubing Cutter Data —The Ridge Tool Company.

Check 4329 opposite last page.

Ultrasonic thickness testers, which are portable, battery-operated resonance-type instruments for nondestructively measuring thickness of variety of metals, glass, rigid plastics and similar materials, are presented in 8-page Audigage Bul — Branson Instruments, Inc.

Check 4330 opposite last page.

Insulation, molded of calcium silicate to exact finished sizes to insure that both inside and outside surfaces are tough, smooth and dust-free is subject of literature. Material may be applied with standard tools. Thermasil Cat — Baldwin-Ehret-Hill, Inc.

Check 4331 opposite last page.

Volt starters which provide automatic synchronization and protection during starting and running are detailed in Bul 8210—EC&M Division of Square D Company.

Check 4332 opposite last page.

Metering pumps which are available in nine sizes with capacities ranging from 1/100 to 500 gpm and pressures from zero to 1000 psi are cataloged in Bul 30 CP — Robbins & Myers, Inc.

Check 4333 opposite last page.

Rotary compressors, the only moving parts of which are rotor, blades and bearings, are detailed in Bul C-5A — Fuller Company, subsidiary of General American Transportation Corporation.

Check 4334 opposite last page.

Motor couplings, featuring simple assembly and generators, for pumps, compressors, speed reducers and generators are covered in Folder 2875 — Link-Belt Company.

Check 4335 opposite last page.

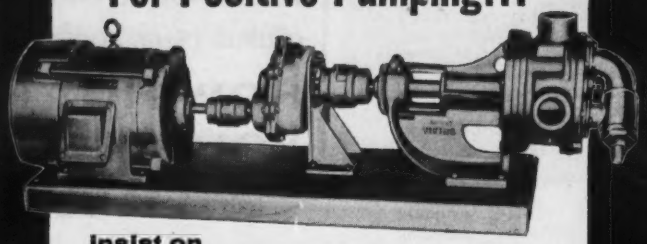
Dryer, built especially for instrument service requiring small quantities of air, is described in Budget Dryer Data — Pittsburgh Lectrodryer Division, McGraw-Edison Company.

Check 4336 opposite last page.

Floor patching which sets rapidly and may be used to repair broken floors or to recover eroded floors is subject of Instant-use Brochure — Flexrock Company.

Check 4337 opposite last page.

For Positive Pumping...



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For complete information, send for catalog CCC, pages 27-28.

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Check 4338 opposite last page.

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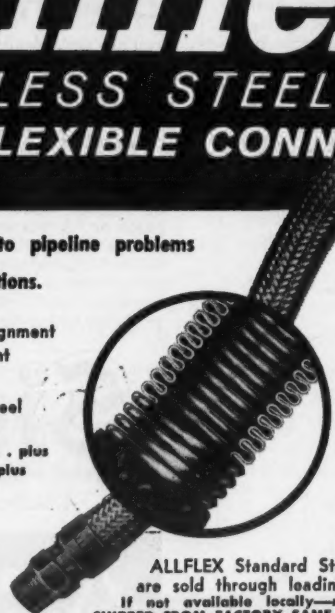

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Check 4339 opposite last page.

CURRENT LITERATURE

Wire-cloth fabrication, ranging from midget strainer to giant-sized retaining screen, is delineated in Wire Cloth Cat — The Cambridge Wire Cloth Company.

Check 4340 opposite last page.

Grating products for walkways, catwalks and treads are considered in General Grating Cat—Irving Subway Grating Co., Inc.

Check 4341 opposite last page.

Protective surfacing by means of sprayed-on alloys is explained in Hard-surfacing Manual 79—Wall Colmonoy Corporation.

Check 4342 opposite last page.

Material Handling and Packaging

Bulk storage units equipped with mechanical bottom unloader and automatic conveying systems are explained in Bul MU-100 — A. O. Smith Corporation.

Check 4343 opposite last page.

Weighing systems from simple dump and weighing to multi-ingredient ratioing are covered in literature. Discussion includes details on pneumatic weight transmitter capable of accuracy of ± 0.25% calibrated weight range, with reproducibility better than 1 part in 2000. Bul 14 — Weighing & Control Components, Inc., division of Compudyne Corp.

Check 4344 opposite last page.

Plastic liners for drums, cans, pails and cartons, and plastic bags are discussed comprehensively in "Facts and Figures Bul" — Protective Lining Corporation.

Check 4345 opposite last page.

Gas transports which utilize special trailer with either single or tandem axle chassis upon which are mounted varying numbers of pressure vessels, are described in Gas Transports Bul—Harrisburg Steel Co., Division of Harsco Corporation.

Check 4346 opposite last page.

Wirebound containers, for regulated and non-regulated liquids, granules and powders, in wide range of sizes are discussed in Wirebound Container Bul — Package Research Laboratory.

Check 4347 opposite last page.

Bale openers which combine automatic feeding and opening of bales of such materials as bagasse, jute cuttings, rags, cotton linters, cork, asbestos, excelsior and straw, are subject of Tech Bul 215 — Taylor Stiles & Co.

Check 4348 opposite last page.

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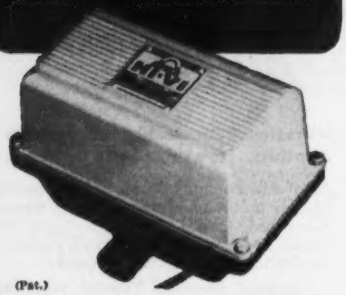

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Check 4350 opposite last page.

CURRENT LITERATURE

Stainless steel drums with seamless chime construction are described in Drums Data — Pressed Steel Tank Company.

Check 4351 opposite last page.

Proportioning system which enables users to automate from bin to batch by combining heaters, scales, controls and readout equipment are discussed in Select-O-Weigh Data — Richardson Scale Company.

Check 4352 opposite last page.

Steel containers — from 1 to 55 gallons, with all closures, styles and linings — are covered in detail in Container Data — Vulcan Containers Inc.

Check 4353 opposite last page.

Weighing systems involving control function for use with tanks, bins, or hoppers are subject of literature. Drawings and text offer tips on how to figure system for your installation. Weighing Systems Data—The A. H. Emery Company.

Check 4354 opposite last page.

Tractor-shovel which features power steering and power shift and has 2500 lb carrying capacity, is subject of H-25 Bul — The Frank G. Hough Co.

Check 4355 opposite last page.

Pneumatic lift truck which handles 10,250 lb of balanced stability in stacks to height of 128¼", described in 6000 PL Truck Bul — Allis-Chalmers.

Check 4356 opposite last page.

Drum handlers which rack, stack and pour and which are available in either power or manual models, are described in Drum Handler Data—Specialty Machinery Corporation.

Check 4357 opposite last page.

Separation and Size Reduction

Colloid mills for services ranging from pilot plant to production are specified in literature. Indicate on reader's service slip data desired as follows: Belt-driven, multi-purpose mill, Bul 541; direct-connected vertical production mill, Bul 542; and high-speed production mill. Bul 543—Premier Mill Corporation.

Check 4358 opposite last page.

Centrifugal impact mills for intimate dispersion of solids are described in Impact Mill Data — Entoleter, division of Safety Industries, Inc.

Check 4359 opposite last page.

Ball mills, available with shell liner of manganese or high carbon steel in plain, wave, cascade, lifter or Lorain type with shells of welded steel construction, are described in detail in Bul 11-121 — Engineering & Manufacturing Division, Fuller Company.

Check 4360 opposite last page.

Separators for variety of liquid entrainment problems including polyethylene measures for corrosion resistance and fiberglass for coalescing sub-micron particle mists, are given full treatment in Bul ME-9—Metal Textile Corporation.

Check 4361 opposite last page.

Centrifugal air separators for classifying most dry fine materials are considered in Air Separation Bul—Rubert M. Gay Division, Universal Road Machinery Co.

Check 4362 opposite last page.

Pelletizers featuring shear-cutting method for plastics and rubber are discussed in Buls 213, 216 and 217—Taylor Stiles & Co.

Check 4363 opposite last page.

Colloid mills in 1 hp to 125 hp models for industrial and sanitary purposes are covered completely in Colloid Mills Data—Chemicolloid Laboratories Inc.

Check 4364 opposite last page.

Centrifugals for high-capacity clarification with automatic sludge ejection are introduced in literature. Units have up to 8000 gph capacity, de-sludging cycle controlled by timing unit, and bowl design for complete self-cleaning. "Big Sam" Bul — Centrico Incorporated.

Check 4365 opposite last page.

Size reduction mill featuring 360° screen is described in Bul 350—Pharmaceutical Division, F. J. Stokes Corporation.

Check 4366 opposite last page.

When you're choosing a protective coating...

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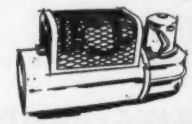
A Nose Cone Gets Hot

When conventional organic finishes were used in Chrysler Redstone Missile tests, they ignited and disintegrated under simulated re-entry conditions. Sicon survived because it possessed the inherent heat resistance to meet performance requirements. This has been confirmed in large scale tests and actual missile firings.

A Truck Heater Gets Hot



A porcelain type coating used on a truck heater failed because it could not stand the thermal shock of rapid heating and cooling. The same heating (550°-600°F.) and cooling left Sicon's film integrity unaffected.

A Tractor Engine Gets Hot

A farm equipment manufacturer used a bright organic red color on their standard equipment. The coating on the engine parts, which were subjected to high temperature, quickly decomposed. Midland engineers developed a matching bright Sicon Red which retained its color and gloss and protected the hot spots on the engine.

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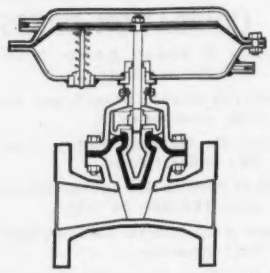

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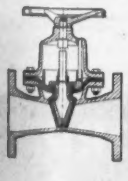

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DIA-PLUG Division of Cryogenics Corporation
500 Terrace St., Meadville, Penna.

Check 4369 opposite last page.

CURRENT LITERATURE

Filtration and Dust Collection

Filter tubes which are available in cotton, nylon, orlon, dynel, acetate and glass fiber, are delineated, along with specifications and illustrations, in four-page Bul GEO-514—Commercial Filters Corporation.

Check 4370 opposite last page.

Dust filters, which require minimum space and utilize single exhaust fan that provides both suction for dust collection and air for bag cleaning, are among items detailed in 36-page Cat 104—The W. W. Sly Manufacturing Co.

Check 4371 opposite last page.

Filter equipment and services including laboratory testing and evaluation of slurries, pilot plant scale tests, recommendation of equipment and information about custom-design equipment are discussed in Bul KSI-3—Industrial Filter Division, Komline-Sanderson Engineering Corporation.

Check 4372 opposite last page.

Vacuum filters for efficient filtration of industrial process water where highly polished water is required, are featured in brochure. Two models are discussed, one with flat leaf filter elements, and the other with concentric leaf filter elements. Bul 1860.20-2 — Proportioneers Division, B-I-F Industries, Inc.

Check 4373 opposite last page.

Horizontal pressure filters, designed with "lift out" leaves to speed screen replacement and provide easy access for filter maintenance, are discusssed in Bul 122—Industrial Filter & Pump Mfg. Co.

Check 4374 opposite last page.

Dust collectors, designed and constructed for high recovery efficiency and low gas resistance, are covered in Bul C-958 — The Ducon Company Inc.

Check 4375 opposite last page.

Porcelain filters for clarification, polishing, cold sterilization of pharmaceuticals, fine chemicals and other continuous operations where physically pure liquids are required, are specified in Bul 149 — Selas Corporation of America.

Check 4376 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

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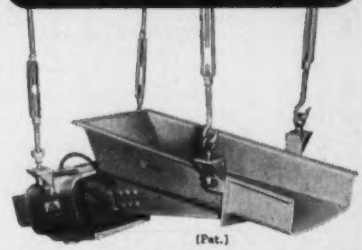
BIG CAPACITY VIBRATORY FEEDERS



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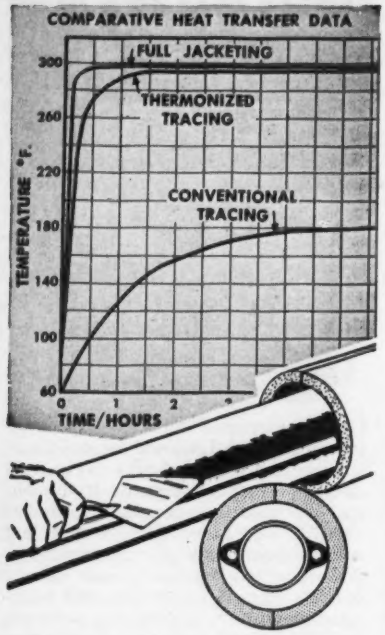

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recent books

High polymers, what they are and how they're made, are detailed in 82-page booklet derived from the Humble Lectures in Science presented by the author, Carl S. Marvel in June of 1956. Adapted to the interest of those just starting research in polymer chemistry, the book first defines the terms used, before going on to discuss such concepts as: polymerization, linear polymers, condensation and addition polymerization, and branched and cross-linked polymers.

To obtain "An Introduction to the Organic Chemistry of High Polymers" remit $4.50 to John Wiley & Sons, Inc., 440 Fourth Avenue, New York 16, N. Y.

Check 4379 opposite last page.

Inorganic Chemistry's progress, particularly since World War II is presented in this first of a proposed series. Among topics considered in 566-page Volume I, edited by F. Albert Cotton, Department of Chemistry, Massachusetts Institute of Technology, are the following: Cyclopentadienyl and Arene Metal Compounds; Interstitial Compounds of Graphite; Uber Schwefel-Stickstoff-Verbindungen; and others. Volume is indexed by author and subject.

To obtain "Progress in Inorganic Chemistry Volume I" remit $14.50 to Interscience Publishers, Inc., 250 Fifth Avenue, New York 1, New York.

Check 4380 opposite last page.

Proceedings of the Sixth Midwestern Conference on Fluid Mechanics and the Fourth Midwestern Conference on Solid Mechanics have been published. The meetings were held jointly at the University of Texas in Austin in September 1959. Volume on fluid mechanics covers 465 pages, includes 30 papers. Solid mechanics book consists of 530 pages, has 29 papers. Copies of the proceedings may be obtained at $12.50 per volume from Engineering Institutes, Division of Extension, The University of Texas, 18th and Red River Streets, Austin, Texas.

Check 4381 opposite last page.

"Source Book of Industrial Solvents Volume 3" presents the physical properties, azeotropic mixtures and uses of industrial monohydric alcohols. This book by Ibert Mellan, Director of the Research Laboratories, Polychrome Corporation, traces production of alcohol from early malting and brewing to present day synthesis by Fischer-Tropsch, Isosynthesis, Oxo and Oxyl processes. Section on nomenclature includes commercial names.

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A. O. Smith Stainless Lined Pressure Tanks; 10'x18'7"; 11,000 Gal.

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Baker Perkins Heavy Duty Jacketed Double Arm Mixers to 300 gals.
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Birmingham 3 Roll Calendar 22" x 58" with 125 HP Motor and Drive
Banbury "Type B" Mixer; Utility Rubber Cutter; Flow Meter Combinators
ChemicColloid Mill Model A 15; SS Rotor-Stator; 15 HP 3525 RPM Motor
Stokes Vacuum Impregnator Model 5648; 100 PSI Internal and Jacket
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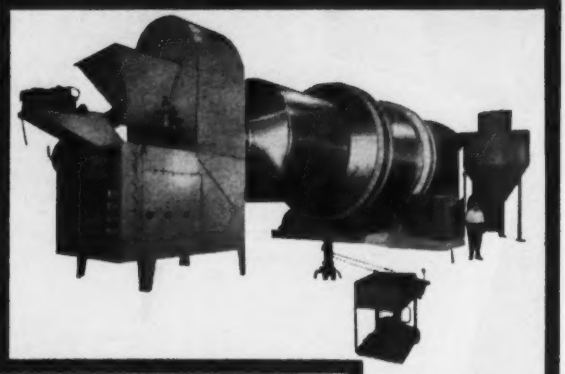

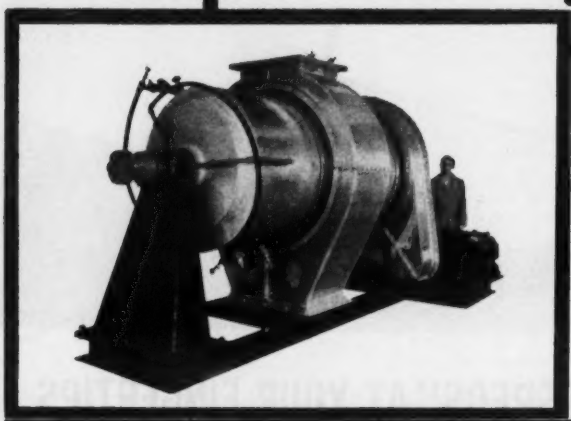

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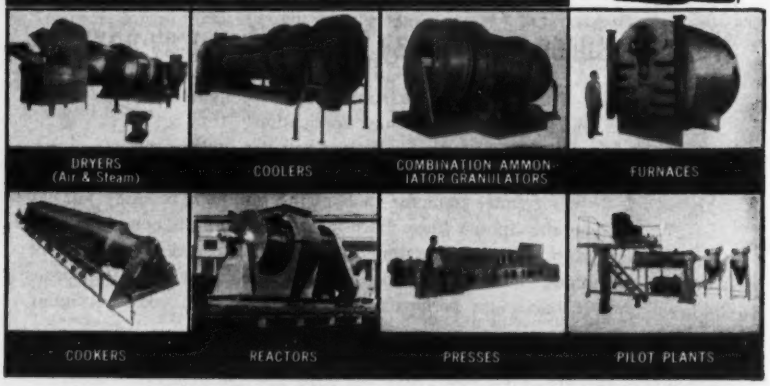

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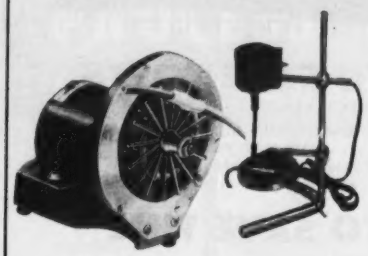
for Laboratory Use



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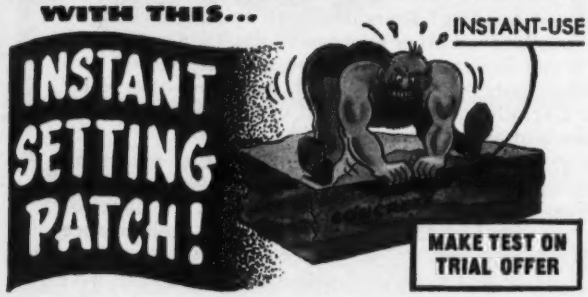

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that's interesting

Thought-provoking slants on projects and products

How much do you think part per million is?

If you've had difficulty visualizing the significance of parts per million, a phrase which gained some prominence recently in connection with cranberry contamination, here are some comparisons which may help.

For example, ppm equals: 10 crystals of granulated sugar in 5 lb; 10 drops of water in 160 gal; a dime in $100,000; or 10″ in 158 miles.

Antibiotic makes possible red meat pre-packaging

A spoilage-retarding antibiotic used in solution and sprayed onto red meats enables them to be pre-packaged in a central location by a food processor or slaughter-house.

American Cyanamid Company announced tests indicate antibiotics extend freshness time sufficiently to make marketing of pre-packaged red meats a reality. Research was conducted with the company's antibiotic, chlortetracycline. In addition to spraying tests, injections of the antibiotic were made directly into beef and lamb before and after slaughtering with successful results.

New pain reliever drug

A drug for relief of muscle and joint pain has been developed by Wallace Laboratories, New Brunswick, N. J.

It is called Soma. Its chemical formulation is N-isopropyl-2-methyl-2-propyl-1, 3-propanediol dicarbamate.

Soma's discoverer is Dr. Frank M. Berger, research director of Wallace. He describes the new compound as being an unique combination of muscle relaxant and pain reliever, which in some way appears to modify central perception of pain.

BIG LINE-UP BIG PERFORMANCE

Johnson Solenoid Valves are built for heavy duty service . . . handling, air, water, steam, heavy viscous liquids. No pilots or pistons; powerful leverage design opens smaller valves against 250 lbs. Because of the remoteness of the solenoid, temperatures up to 400° F. are easily handled without adverse effect on the solenoid coil. Bodies are bolted together. Explosion-proof models also.

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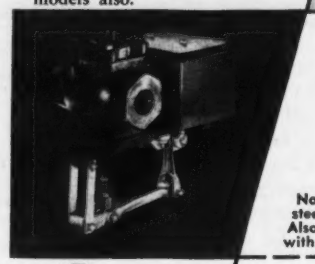
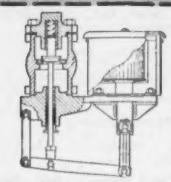
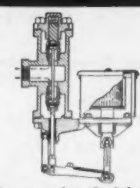
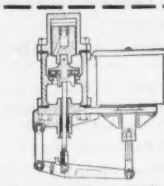




Normally closed service, stainless steel valve and seat. Sizes ⅜"-3". Also for normally open service, and with Jenkins Disc.



3-way valve. Stainless steel valves and seats. Sizes ½"-1½".



Dashpot construction, cushions closing to avoid water hammer. Jenkins Disc. Sizes ¾"-2".

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THE JOHNSON CORPORATION
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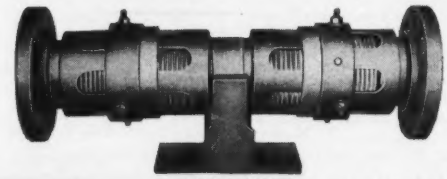
MULTI-PLY
EXPANSION JOINTS of STAINLESS STEEL



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☐ 3815	☐ 3865	☐ 3915	☐ 3965	☐ 4015	☐ 4065
☐ 3816	☐ 3866	☐ 3916	☐ 3966	☐ 4016	☐ 4066
☐ 3817	☐ 3867	☐ 3917	☐ 3967	☐ 4017	☐ 4067
☐ 3818	☐ 3868	☐ 3918	☐ 3968*	☐ 4018	☐ 4068
☐ 3819	☐ 3869	☐ 3919	☐ 3969	☐ 4019	☐ 4069
☐ 3820	☐ 3870	☐ 3920	☐ 3970	☐ 4020	☐ 4070
☐ 3821	☐ 3871*	☐ 3921	☐ 3971	☐ 4021	☐ 4071
☐ 3822	☐ 3872*	☐ 3922	☐ 3972	☐ 4022	☐ 4072
☐ 3823	☐ 3873	☐ 3923	☐ 3973	☐ 4023	☐ 4073
☐ 3824	☐ 3874	☐ 3924	☐ 3974	☐ 4024	☐ 4074
☐ 3825	☐ 3875	☐ 3925	☐ 3975	☐ 4025	☐ 4075
☐ 3826	☐ 3876	☐ 3926	☐ 3976*	☐ 4026	☐ 4076*
☐ 3827	☐ 3877	☐ 3927	☐ 3977	☐ 4027	☐ 4077
☐ 3828	☐ 3878	☐ 3928	☐ 3978	☐ 4028	☐ 4078

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☐ 4080	☐ 4133	☐ 4186	☐ 4239*	☐ 4292	☐ 4345
☐ 4081	☐ 4134	☐ 4187	☐ 4240	☐ 4293	☐ 4346
☐ 4082	☐ 4135	☐ 4188	☐ 4241	☐ 4294	☐ 4347
☐ 4083	☐ 4136	☐ 4189	☐ 4242	☐ 4295	☐ 4348
☐ 4084	☐ 4137	☐ 4190*	☐ 4243	☐ 4296	☐ 4349
☐ 4085	☐ 4138	☐ 4191	☐ 4244*	☐ 4297	☐ 4350
☐ 4086	☐ 4139	☐ 4192	☐ 4245	☐ 4298*	☐ 4351
☐ 4087	☐ 4140	☐ 4193	☐ 4246	☐ 4299	☐ 4352
☐ 4088	☐ 4141	☐ 4194	☐ 4247	☐ 4300*	☐ 4353
☐ 4089	☐ 4142	☐ 4195	☐ 4248	☐ 4301	☐ 4354
☐ 4090	☐ 4143	☐ 4196	☐ 4249	☐ 4302	☐ 4355
☐ 4091	☐ 4144	☐ 4197	☐ 4250	☐ 4303	☐ 4356
☐ 4092	☐ 4145	☐ 4198	☐ 4251	☐ 4304	☐ 4357
☐ 4093	☐ 4146	☐ 4199	☐ 4252	☐ 4305	☐ 4358*
☐ 4094	☐ 4147	☐ 4200	☐ 4253	☐ 4306	☐ 4359
☐ 4095	☐ 4148	☐ 4201	☐ 4254	☐ 4307	☐ 4360
☐ 4096	☐ 4149	☐ 4202	☐ 4255	☐ 4308	☐ 4361
☐ 4097	☐ 4150	☐ 4203	☐ 4256	☐ 4309	☐ 4362
☐ 4098	☐ 4151	☐ 4204	☐ 4257	☐ 4310	☐ 4363
☐ 4099	☐ 4152	☐ 4205	☐ 4258	☐ 4311	☐ 4364
☐ 4100*	☐ 4153	☐ 4206	☐ 4259	☐ 4312	☐ 4365
☐ 4101	☐ 4154	☐ 4207	☐ 4260	☐ 4313	☐ 4366
☐ 4102	☐ 4155	☐ 4208	☐ 4261	☐ 4314	☐ 4367
☐ 4103	☐ 4156	☐ 4209	☐ 4262	☐ 4315	☐ 4368
☐ 4104	☐ 4157	☐ 4210	☐ 4263	☐ 4316	☐ 4369
☐ 4105	☐ 4158	☐ 4211	☐ 4264	☐ 4317	☐ 4370
☐ 4106	☐ 4159	☐ 4212	☐ 4265	☐ 4318	☐ 4371
☐ 4107	☐ 4160	☐ 4213	☐ 4266	☐ 4319	☐ 4372
☐ 4108	☐ 4161	☐ 4214	☐ 4267	☐ 4320	☐ 4373
☐ 4109	☐ 4162	☐ 4215	☐ 4268	☐ 4321	☐ 4374
☐ 4110*	☐ 4163	☐ 4216	☐ 4269	☐ 4322	☐ 4375
☐ 4111	☐ 4164	☐ 4217	☐ 4270	☐ 4323	☐ 4376
☐ 4112	☐ 4165	☐ 4218	☐ 4271	☐ 4324	☐ 4377
☐ 4113	☐ 4166	☐ 4219	☐ 4272	☐ 4325	☐ 4378
☐ 4114	☐ 4167*	☐ 4220	☐ 4273	☐ 4326	☐ 4379
☐ 4115	☐ 4168	☐ 4221	☐ 4274	☐ 4327	☐ 4380
☐ 4116	☐ 4169*	☐ 4222	☐ 4275	☐ 4328	☐ 4381*
☐ 4117	☐ 4170	☐ 4223	☐ 4276	☐ 4329	☐ 4382
☐ 4118	☐ 4171	☐ 4224	☐ 4277	☐ 4330	☐ 4383
☐ 4119	☐ 4172	☐ 4225	☐ 4278	☐ 4331	☐ 4384*
☐ 4120	☐ 4173	☐ 4226	☐ 4279	☐ 4332	☐ 4385
☐ 4121	☐ 4174	☐ 4227	☐ 4280	☐ 4333	☐ 4386
☐ 4122	☐ 4175	☐ 4228	☐ 4281	☐ 4334	☐ 4387
☐ 4123	☐ 4176	☐ 4229	☐ 4282	☐ 4335	☐ 4388
☐ 4124	☐ 4177	☐ 4230	☐ 4283	☐ 4336	☐ 4389
☐ 4125	☐ 4178	☐ 4231	☐ 4284	☐ 4337	☐ 4390
☐ 4126	☐ 4179	☐ 4232	☐ 4285	☐ 4338	☐ 4391
☐ 4127	☐ 4180	☐ 4233	☐ 4286*	☐ 4339	
☐ 4128	☐ 4181	☐ 4234	☐ 4287	☐ 4340	
☐ 4129	☐ 4182	☐ 4235	☐ 4288	☐ 4341	
☐ 4130	☐ 4183	☐ 4236	☐ 4289*	☐ 4342	
☐ 4131	☐ 4184	☐ 4237	☐ 4290*	☐ 4343	

Be Sure To Give Your Address

*On all numbers having an asterisk (*) after them, please identify the exact product or piece of literature in one of the blank columns on this and front page. Write in the key number, as given on the slip, followed by the bulletin number (or title), or name of product in which you are interested.

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THAT'S INTERESTING

Flower beds of foam

Urethane foam in slabs is being used to help grow flowers. Floral displays can be created by cutting or seeding in special shapes or designs.

Seeding is done directly onto foam which is kept moist during germination. Roots grow through foam into submedium of fine gravel and vermiculite. No weeds interfere. A 5/8" thickness of foam is most practical.

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Polyurethane elastic threads may bring an end to such things as sloppy socks and lazy girdles. New fibers have pulling force stronger than rubber and long life, according to Dr. Seymour Polansky, director of research and development, Globe Manufacturing Company.

For more information on product at right, specify 4389 see information request blank opposite last page.

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DRYERS

Parallel and counter-flow; direct, indirect, and indirect-direct heat designs for the accurate and controlled drying of a wide variety of powdery, crystalline or heat sensitive chemical salts, plastics, ores, pharmaceuticals, foods, fertilizers, clays, sand and other materials. Sizes to 120" in dia. x 100 ft. long.

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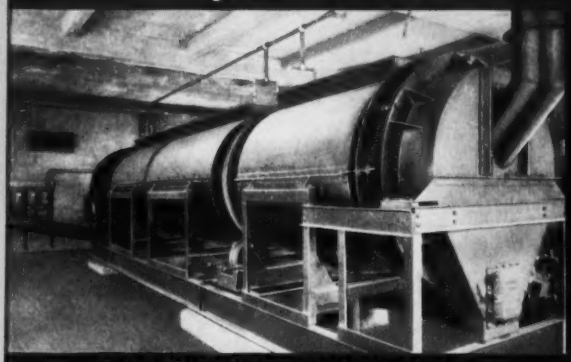

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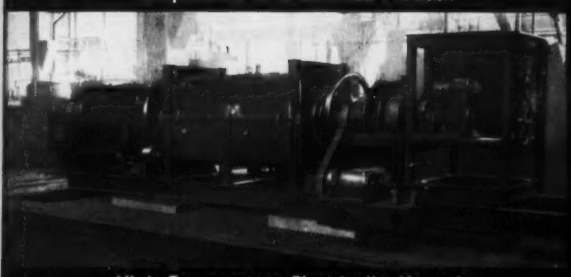

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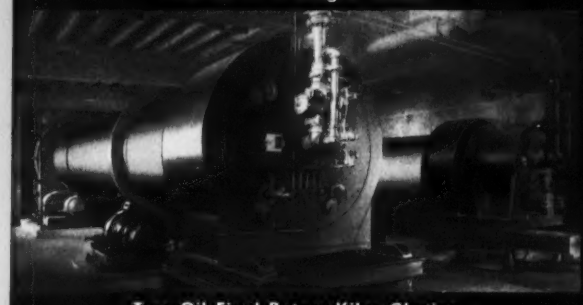

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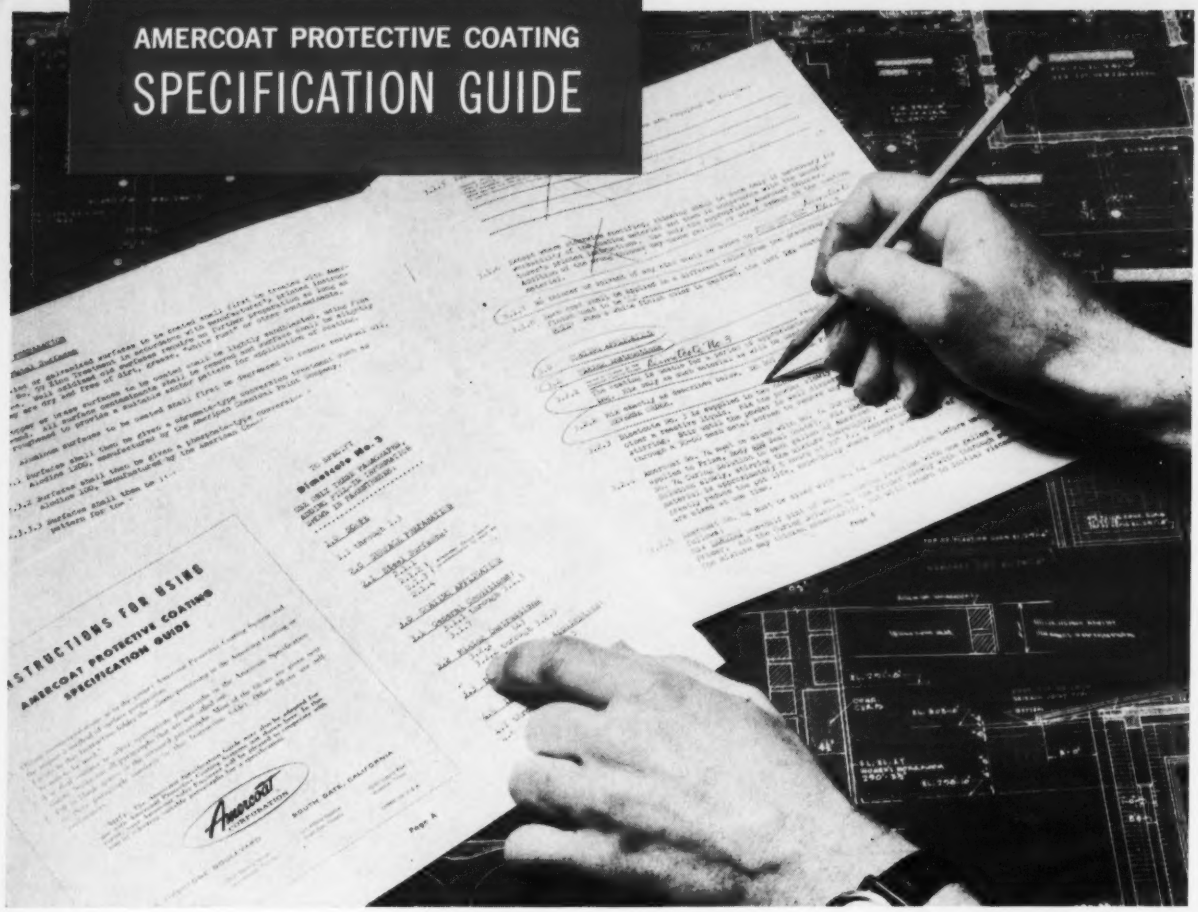

Here's the Beginning of a Good Coating Job

Tight, comprehensive specifications are the beginning of a successful protective coating application. Unless specifications are complete and detailed, costly failures or confused, inaccurate bidding can result.

Now, engineers who write specifications for protective coating applications can insure complete, accurate specifications through use of the new Amercoat Protective Coating Specification Guide.

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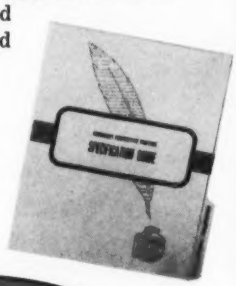

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